PACKAGE engineering

How to fill powder without losing it

Proper use of air to move powder, adequate dust removal, matching of cans and machine parts, and good line practices contribute to peak efficiency in powder filling—with negligible powder losses. (See Page 39)

Using tape to protect box scorelines

Tests by government researchers in using lengths of tape (instead of sleeves) to reinforce fibreboard box scorelines reveal protection of contents and point to commercial use of this technique. (See Page 44)

Quality control of packaging components

Stressing good user-supplier relationships, a user tells how to control incoming packaging component quality (see Page 56) and an adhesives specialist spotlights some subtleties of securing adhesive quality. (See Page 71)

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OCTOBER 1959

Volume 4 • Number 10

Package Engineering
185 N. Wabash Avenue,
Chicago 1, Illinois

Form 3547 requested

BULK RATE
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PONTIAC, ILLINOIS
PERMIT NO. 81

new

SCANDIA "POCKET PACKER"

glues and forms pocket-pack carton from blank

automatically collates and loads cigars

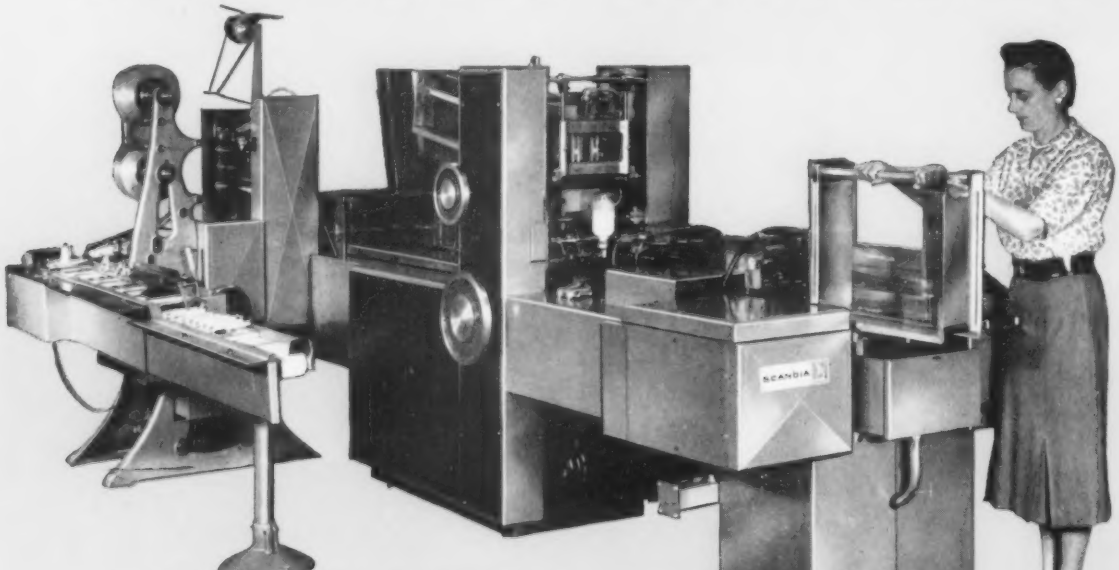
closes carton and overwraps in cellophane with opening tape

Up to now pocket-pack cartoning and wrapping has required several operations—either manual, slow-speed automatic, or a combination of both.

Scandia's new, fully-automatic, high-speed "Pocket-Packer" now combines all these operations in one machine.

The new Scandia Model 401 "Pocket-Packer" actually forms a carton blank (side-opening or conventional type) *around the cigars* as they move through the machine—with all loading, gluing, folding and wrapping done automatically. Adaptable to a full range of cigar sizes...at speeds of 75 pocket-packs or more per minute!

All this results in dramatic savings in capital equipment, labor, floor space, carton costs *and time*. It all adds up to higher pocket-pack production at lower packaging costs.



Let us tell you the fascinating story of this new Scandia machine. Write, wire or telephone today.

P 10

SCANDIA

PACKAGING MACHINERY COMPANY

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Quality Control
PACKAGING

How to PROTECT *your paper profits*

Kimberly Clark's new line of Marvalon drawer and shelf lining and decorative coverings gets dazzling display in VITAFILM. *Marvalon Package by Milprint, Inc.*

Here's a powerful new asset that can be added to the merchandising of paper products. It's VITAFILM — Goodyear's unique, tough, crystal-clear package wrap.

VITAFILM is lustrous — gives an added sparkle to whatever it encloses. Colors and patterns — in shelf paper, greeting cards, stationery, plates, cups and the like — are highlighted.

And this eye-appealing fresh look *lasts* — no matter how long the goods are on display. VITAFILM is no magnet for dust!

VITAFILM has, in addition to beautiful clarity, the ability actually to transmit the "feel" and texture of the product.

But that's only half the job VITAFILM can do for you. The *protection* it affords is unequaled.

Under the roughest handling by shoppers, VITAFILM will not split or run. Its seals, made under a wide temperature range, are heat-welded to be completely strip-proof, are even stronger than the film itself. That's the end of broken-package troubles, spilled contents, unsalable goods!

Because VITAFILM seals quickly and permanently over a wide range of temperatures, it operates smoothly and efficiently on automatic machinery.

If your interest is paper products — or textiles, hardware, pharmaceuticals, foods — you'd best get the VITAFILM story *now* from the Goodyear Packaging Engineer. No obligation, of course. Just write: Goodyear, Packaging Films Dept. J-6432, Akron 16, Ohio.

Vitafilm by GOODYEAR

The best thing between you and your customer

Vitafilm, a Polyvinyl chloride—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

For more information circle No. 202 on Reader Service Card, Page 97

1

Circle No. 201 on Card, Page 97

For your calendar

October 1. Packaging Institute professional member meeting on packaging of dairy products, Sheraton-Blackstone Hotel, Chicago. Contact: Charles A. Feld, executive director, Packaging Institute, 342 Madison Avenue, New York 17, N. Y. *Telephone: MUrray Hill 7-8875.*

October 5-6. Purdue University conference on packaging specifications, Purdue University, Lafayette, Ind. Contact: Mark E. Ocker, Division of Adult Education, Memorial Center, Purdue University, Lafayette, Ind. *Telephone: 92-2533.*

October 16-25. 13th French Packaging Show, Palace of the National Industrial and Technical Centre, Paris, France. Contact: Pierre J. Louis, Institut Francais de L'emballage et du Conditionnement, 3 Rue La Boetie, Paris 8, France. *Telephone: ANjou 68-48-72-56.*

October 19-20. 9th French Packaging Congress, Palace of the National Industrial and Technical Centre, Paris, France. Contact: Pierre J. Louis, Institut Francais de L'emballage et du Conditionnement, 3 Rue La Boetie, Paris 8, France. *Telephone: ANjou 68-48-72-56.*

October 29-30. Industrial Packaging Institute, The University of Wisconsin, Extension Division, Wisconsin Center Building, Madison, Wisconsin. Contact: Richard A. McCormick, Institute Coordinator, Department of Engineering, The University of Wisconsin, Madison, Wisconsin. *Telephone: ALpine 5-2211, Ext. 4513.*

November 2-4. AMA packaging seminar, "Manufacturing's part in the overall packaging program," The Hotel Astor, New York, N. Y. Contact: John L. Wood, American Management Association, 1515 Broadway, New York 36, N. Y. *Telephone: JUdson 6-8100.*

November 9-11. AMA packaging seminar, "Fundamentals of packaging specifications," The Hotel Astor, New York, N.Y. Contact: John L. Wood, American Management Association, 1515 Broadway, New York 36, N.Y. *Telephone: JUdson 6-8100.*

November 16-18. 21st annual national packaging forum of Packaging Institute, Hotel Statler, New York, N. Y. Contact: Charles A. Feld, executive director, Packaging Institute, 342 Madison Avenue, New York 17, N. Y. *Telephone: MUrray Hill 7-8875.*

November 17-20. Packaging Machinery Manufacturers Institute Show, New York Coliseum, New York. Contact: Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22, Pa. *Telephone: ATlantic 1-8552.*

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PACKAGE engineering

AN ANGUS J. RAY PUBLICATION

Articles

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How cross serrations in crimp-sealing jaws increase seal strength, and how such seals require more energy for peeling.

56 Establishing the quality control of packaging components, by Bernard F. Major, manager, packaging laboratory and receiving and stores division, Ortho Pharmaceutical Corporation

What a control system involves and how to establish it, with attention to the knack of making it run smoothly.

71 Specifications/control of packaging adhesives, by E. Patrick McGuire, technical service manager, packaging and specialty products, The Borden Chemical Company

Stressing ten points that aid a packaging engineer in evaluating and controlling adhesive quality on a systematic basis.

81 Effect of packaging on palatability of frozen beef steak, by James D. Winter, Shirley R. Trantanella, W. J. Aunan, Institute of Agriculture, University of Minnesota, and Watson B. Ackart, development department, Union Carbide Plastics Company

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Our December, 1959 issue will carry a cumulative editorial index for the year listing our feature articles by subject, author, and other headings.

Report from a ski manufacturer's shipping room:

"BOSTITCH STAPLERS INCREASED OUR PACKING SPEED 3 TO 4 TIMES"

As you might imagine, skis aren't the easiest things to pack for shipping. But this company finds the job a lot easier—and much faster—since changing to Bostitch stapling.

An operator slips a pair of skis into a long corrugated tube. He folds each carton end twice and seals it securely with two Bostitch staples. Total time to pack a pair—less than 2½ minutes. With former method, the same operator needed 7½ to 10 minutes. *Stapling is three to four times faster.*

Time is the biggest saving, but staples also cost less. And cartons are neater and more securely sealed.

Your shipping room may provide opportunities where Bostitch staplers can bring you more speed, lower cost and more efficiency. Have a Bostitch Economy Man show you. You'll find him listed under "Bostitch" in your phone book. Or, you can mail the coupon.

Fasten it better and faster with

BOSTITCH®
STAPLERS AND STAPLES

With every Bostitch machine you get... assurance of the right combination for your needs from 800 staplers and over 200 staples . . . an extra margin of quality . . . nation-wide parts, service and technical aid . . . dependable supply from the industry's most modern factory . . . and we stand behind every Bostitch machine, making sure it operates to your complete satisfaction.

Bostitch, 870 Briggs Drive, East Greenwich, R.I.
Please send me information on the use of Bostitch staplers in the shipping room.

We ship _____ (Kind of product)
We now ship in _____ (Type of container)
We now fasten with _____ (Container fastening method)
Name _____
Company _____
Address _____
City _____ Zone ____ State _____

A note from the Publisher

The PMMI Show

We are all in business to make a profit. That is obvious, of course, but how to make a profit is *not* always so obvious. In the sale of packaged merchandise, for instance, some companies believe that an attractive appearing package is the whole answer to their packaging problem. Unfortunately, the merchandising device, important as it may be, gives only a temporary advantage, if its successful competition copies it and perhaps improves on it.

It is impossible to maintain or improve a profit margin under the philosophy that the only thing you have to sell is an attractive package. A product must win the buyers' approval in price competition at the point of sale and must maintain the approval of the buyer every time it is used, if the desire and aim is to get repeat sales, which of course it is.

To preserve product quality and remain competitively priced, you must be vigilantly on the lookout for *better* packaging methods and materials. You must continually re-evaluate your packages *and* your packaging methods in the light of how your own business is developing, what your competition is doing, and what suppliers are bringing out that you could more profitably use.

The particular time and place to re-evaluate your packaging machinery is the Packaging Machinery Manufacturers Institute Show, which will occupy two floors of the New York Coliseum, November 17-20. The show, which has been sold out for months, will be packed with working exhibits of all kinds of packaging machinery. Every major manufacturer of packaging machinery is exhibiting, and it offers you an opportunity to measure the efficiency of your present packaging line against the latest developments of the industry.

Obviously, each new piece of equipment makes certain demands on packages—especially as machine speeds increase. Conversely, some of the older pieces of machinery will *not* operate satisfactorily with some of the newer packaging materials. A number of package suppliers are exhibiting, also, so you can get answers to questions on performance characteristics of various types of packaging materials, adhesives, and so on.

During the same week, and also in New York, the Packaging Institute is holding its 21st Annual Forum at the Statler Hotel. During the three-day period it is being held, November 16-18, twelve seminars are scheduled on a wide variety of subjects covering packaging for retail sales, as well as packaging for use by industry.

By writing to both organizations, whose addresses are listed in our "For your calendar" column on Page 2, you can get advance registration forms which will save you some time in New York and also make it easier for people to locate you while you are there.

Our November issue will carry complete details on both these events and will be on your desk two weeks before the show starts, giving you ample time to plan your trip, and also your time.

Angus J. Ray

Publisher

PACKAGE engineering®

AN ANGUS J. RAY PUBLICATION

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BPA

HOW AVISCO® CELLOPHANE SEALS IN GOODNESS

Cellophane is much more than a sparkling, transparent wrap that adds sales appeal. The film itself and the consistent, secure sealing it provides make it unmatched for *locking in* aroma and flavor—and keeping foods *fresher longer*. There are types of Avisco cellophane to give the exact moisture control different foods need. These films are also gasproof and impermeable to grease. What's more, cellophane is basically the most *versatile* of all films. It can be tailored to meet almost any requirement. Chances are there's a special coating or lamination that's just right for *your* product. What about cost? The initial cost of Avisco cellophane is *low*.

But even more important, its performance is *trouble-free* on high-speed packaging machines. Cellophane feeds and forms perfectly because it's rigid and static-free. And it heat-seals quickly and securely over a wide temperature range. Just as important is its *consistency* of quality. We offer a complete packaging service to assist you and demonstrate how Avisco cellophane, plain or printed, will answer your requirements *better* and *more economically* than any other packaging material. Contact us for an appointment with our representative in your area or a selected cellophane converter specializing in your field.

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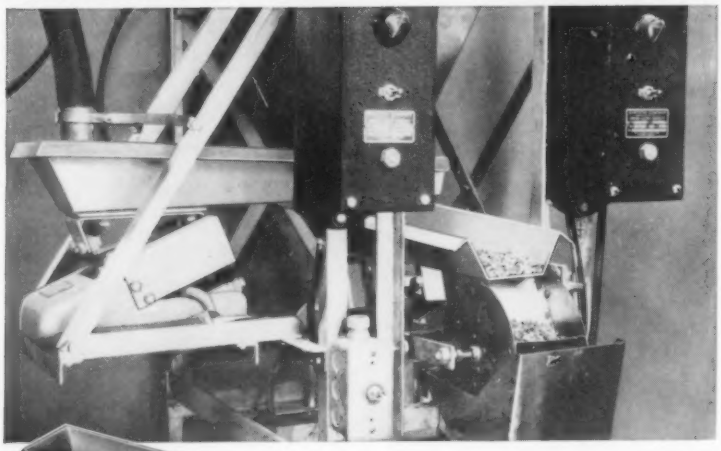

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—by providing an efficient, high capacity flow controlled method of transferring bulk materials from storage hoppers to packaging or bagging equipment or from one operation to another.

Uses for SYNTRON Vibratory Feeders in packaging and allied industries are almost unlimited—packaging, bagging, mixing, weighing etc. Feed rate is instantly adjustable—material flow is smooth and uniform. 3600 efficient, powerful, controlled electromagnetic vibrations per minute move even hard-to-handle materials. This principle eliminates mechanical wearing parts and assures dependability and low maintenance.

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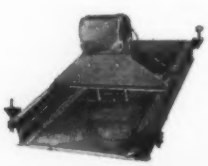

VIBRATING SCREENS

Letters to PACKAGE engineering

Re: Manual packaging

Gentlemen:

Your editorial "Let's not take manual packaging for granted" should be a "must read" for every man in the organization, from foreman to president. It should open their eyes.

I especially endorse your statement, "In any case we urge switching from defensive to offensive thinking about manual packaging." And I am in accord with your statement, "How can we make the most of the inherent flexibility in using five fingers on two hands?" Most operators in most plants are like the one handed fighters that we see on television today. If production men would take motion pictures of the manual work being done in their plants, they would be amazed to see how little the average operator uses her left hand.

Trying to train the girls to use both hands is almost overlooked by the supervisory people. In my opinion too many managers take pride in the fact that, as they state it, "My business is different." We can't eliminate hand work. Or they fall in the opposite class. They want 100 per cent mechanization or none at all, never dreaming the "staggering" cost of 100 per cent mechanization. One half of a mechanized loaf is certainly better than none at all, unless it be 100 per cent. Don't you agree?

Jos. F. Reis
Reis Associates
Tarrytown, New York

While we have always urged higher standards of line performance and the advance of mechanization, we also have noted the need of compromising with realistic conditions. Peak performance may mean best use of human hands. (*End*)

Shipping and storage room at Vactron Corporation, Mansfield, Texas. (Inset) New hold down pad holds TV picture tubes firmly in place, gives added strength to container

HOERNER-DESIGNED CORRUGATED CONTAINER

SAVED $10,000 PER YEAR

Vactron Corporation of Mansfield, Texas manufactures television picture tubes in 138 different sizes and types. When that company began shipping its fine product to distributors they needed a container that protected the tube and was strong enough to stand up under the rigors of shipping and storage.

One of the problems common to manufacturers of cathode ray tubes is carton appearance. Consumers know that TV picture tubes are delicate electronic devices. They are wary about buying a tube that's in a box showing wear.

For this reason, distributors commonly reject any container that shows damage even though the tube itself be in perfect condition. These rejects cost money to ship, re-test, re-pack and re-ship.

A Hoerner Packaging Engineer* helped Vactron overcome this problem and reduce labor and material costs by $10,000 per year. A new hold-down pad was designed to keep the tubes firmly in place and give the corrugated container added strength on the corners.

The new "I" pad is the reason Vactron tubes arrive at the distributor's in clean, sharp-looking corrugated containers. The problem of distributor rejects has been eliminated with a resulting savings in repacking, re-shipping and extra carton inventory costs. Material costs were cut because the "I" pad allowed the use of single-wall instead of double-wall corrugated. And Vactron reclaimed several hundred feet of floor space in the storage area because the "I" pad allowed stacking four and more high without danger of damage to the carton.

HOW A HOERNER PACKAGING ENGINEERING CAN HELP YOU

If you package things, call the Hoerner plant nearest you. A Packaging Engineer will study your operation without obligation. He can increase your profit margin by reducing labor and material costs and shipping losses. All through improved packaging with corrugated. Call today.

* *The Packaging Engineer Responsible: R. G. Hackney.*

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For more information circle No. 206 on Reader Service Card, Page 97

The PULSE / of Packaging

Packaging across the seas:

Organizers of **Interpack 1960,** an international packaging exhibition (which includes a display of confectionery machinery), to be held at Dusseldorf, Germany, April 20-27, 1960, plans attention to both machinery and material. "It is the task of the Interpack to show all manufacturing concerns ways and means of integrating mechanical packing in the flow of the manufacturing process in the most practical and economical manner," according to its sponsors, who note also the increasing interest and emphasis on "packing substances and materials." Interpack 1960 takes place at the same time as the **German Industrial Fair** in Hanover.

The Lakso Co., Inc. has licensed **Packaging Machinery (Peters) Ltd.,** Slough-Bucks, England, maker of packaging and special purpose machinery, to build and sell its equipment to English and European pharmaceutical manufacturers . . . **Arenco AB** of Stockholm, Sweden, has acquired control of **Alite Machines, Ltd.,** a British firm, and reports that the new name of this company is **Arenco-Alite Machines, Ltd.** It plans to offer a "more complete line of machinery for packaging, including additional equipment for granular and powder filling."

Trends to watch:

Manufacturers of packaging machinery predict that in 1960 their sales volume, together with that of related packaging materials, will run some 27 per cent higher than that of 1959, according to a survey made among exhibitors in this year's **Packaging Machinery Manufacturers Institute Show** . . . The aerosol division of the **Chemical Specialties Manufacturers Association** is conducting two educational technical clinics this month—one in New York, one in Chicago. Its object is to provide the aerosol industry, especially junior-level management, operators and technicians, basic and up-to-date information on pressure filling operations, according to CSMA.

Proper Marking Association has been organized this summer to stimulate better marking of shipments, to inform companies and the public about improved marking, and to cooperate with carriers along these lines—to insure safe delivery of shipments . . . We hear that the **Coca-Cola Co.** is now test-marketing "Coke" in a 12-oz. flat top metal can in several cities in New England . . . Soft drink shipments in metal cans jumped 28 per cent for the first half of this year, as compared to the first six months of 1958, according to **Can Manufacturers Institute.**

Shipments of collapsible metal tubes for the first five months this year ran 20 per cent above the same period of 1958, according to **Collapsible Tube Manufacturers Council.** Sharpest increase was in cosmetic packaging, but that of medical and pharmaceutical products also rose notably, according to the council . . . Fibre cans and tubes are enjoying the greatest sales year in the history of the industry, reports **National Fibre Can and Tube Association.** Its industry's total volume to August 1 this year ran 19 per cent higher than that of the same seven-month period of 1958.

National Safe Transit Committee Inc. has issued a new revised edition of its official test procedures booklet, describing procedures of its preshipment tests. Single copies are available without charge from NSTC at 1145 Nineteenth Street, N.W., Washington 6, D. C.

More expansion for packaging:

Continental Can Co. will build a 250,000-sq. ft. can plant and warehouse near St. Joseph, Mich. . . . A 32,000-sq. ft. building to house the finishing department for packaging roll products will be added to its Brookside facilities by **The Dobeckmun Co.** . . . **B. B. Chemical Co.,** a **United Shoe Machinery** subsidiary, will expand its Cambridge service laboratory facilities.

Du Pont's expansion plans include—plant to produce polyethylene resin in Victoria, Tex.; plant to produce polyethylene film in Richmond, Va.; laboratory and office facilities for its Mylar plant, Circleville, O.; modernization of manufacturing facilities for Cel-O-Seal bands, Buffalo.

Stone Container Corp. has purchased **Acme Carton Co.** and **Delmar Paper Box Co.** . . . The opening of its 80,000,000-lb./yr. Whiting, Ind. plant brings **Union Carbide's** production of low-density polyethylene to over 400,000,000 lb./yr. . . . **International Paper Co.** is breaking ground for a plant near Omaha.

Plastic Horizons, Inc.'s 27,000-sq. ft. plant at Batavia, Ill. plans to be in production this month . . . As of September 1, **Weyerhaeuser Timber Co.** will be shortened to **Weyerhaeuser Co.** and the **Kieckhefer-Eddy** names will be discontinued . . . **Acme Backing Corp.** announces the addition of 10,000 sq. ft. to its manufacturing space . . . **Rap-In-Wax Paper Co.** has purchased **Cotswold Fibres, Inc.** Also, Rap-In-Wax has opened three regional sales offices in Chicago, Kansas City, Mo. and Minneapolis.

The capital stock of **San Luis Valley Starch Co.** and **Monte Vista Sales Co.,** Monte Vista, Colo., has been acquired by **Morningstar-Paisley, Inc.** . . . **Gilman Paper Co.** will erect a converting plant of approximately 300,000 sq. ft. in St. Marys, Ga. to house the operations of its kraft bag subsidiary . . . **Fome-Cor Corp.'s** new Addyston, O. plant has begun full-scale production.

Aeroplastics Corp. will move to new and larger facilities in Venice, Calif. . . . **Anchor Hocking Glass Corp.** has started manufacturing operations at its new glass container plant at San Leandro, Calif. . . . **Aeropak, Inc.** has purchased new facilities at Kearney, N. J. to increase its aerosol packaging capacity.

Construction has begun on the 40,000-sq. ft. expansion of **Plax Corp.'s** Deep River, Conn. plant . . . **Resina Automatic Machinery Co., Inc.** has added a new wing to its Brooklyn plant . . . As part of its $30,000,000 expansion program, **Olin Mathieson Chemical Corp.** will build new facilities at Joliet and Brandenburg, Ky.

Packaging dollars and cents:

West Virginia Pulp and Paper Co. reports earnings for the first nine months of this year of $8,682,000, as compared to $6,820,000 for the same 1958 period. Net sales for 1959's first nine months totaled $171,670,000, an increase of 14 per cent over $150,263,000 for the first nine months of the previous year . . . Net sales of **Plastic Materials and Polymers, Inc.** were $4,945,000 for the fiscal year ending June 30, 1959, compared with $4,292,944 in 1958. 1959 earnings (before taxes) more than doubled from $115,000 in 1958 to $300,000.

Bemis Bro. Bag Co.'s sales for the first six months of this year totaled $64,069,940, as compared to $57,684,820 for the same 1958 period. Net income for the 1959 six-month period was

Circle No. 207 on Card, Page 97

DO YOU KNOW

how versatile the HUDSON-SHARP Campbell Wrapper really is?

FOR PRODUCTION VERSATILITY—

You can wrap and seal with the material of your choice — for the preservation you need and sales turn-over you expect, with a Campbell Wrapper. (1) It hermetically heat seals (including for gas flush) films and foils. (2) It heat seals other materials... including waxed papers. (3) It glues and/or crimp seals still other materials. Only the Campbell Wrapper does all three! In addition, you benefit from increased production because it automatically wraps single or multiple product packs—in rows, on edge, or stacked, at speeds up to 300 units per minute!

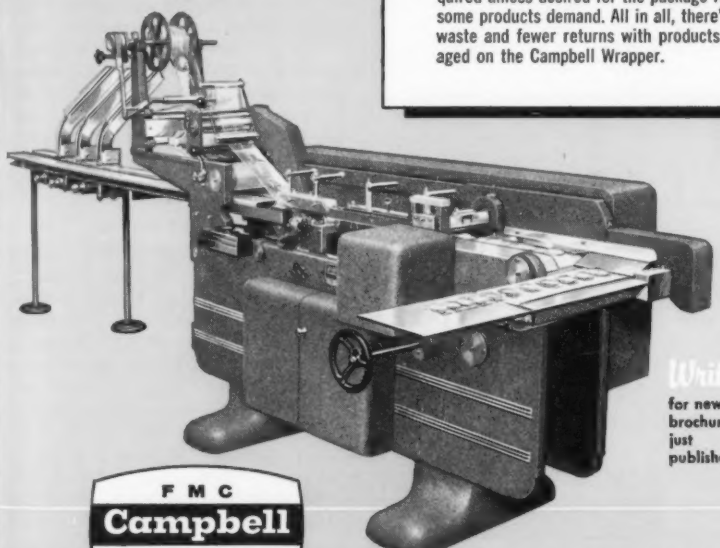
FOR DIVERSIFIED PRODUCTS—

Hard or soft — crisp, brittle or fragile . . . Whatever your product's consistency, it can be packaged on a Campbell Wrapper, without crush or breakage! Shape makes little difference either, for this machine wraps products that are square, oblong, round, oval, cylindrical, flat or irregular in shape. Campbell wrappers package a vast variety of products such as:— Crackers, Cookies and other bakery items; Candies and Ice Cream; Cheese, Bacon, Franks and Table-Ready Meats; Pharmaceutical supplies; Hardware parts; Textiles; Paper Products and 1001 varied items.

WRAPS WITH KRAFTS, GLASSINES, WAX PAPERS, FOILS, CELLOPHANE, POLYETHYLENE, PLIOFILM AND OTHER PLASTIC FILMS

FOR OPERATING ECONOMY—

Labor costs decrease with the Campbell Wrapper as in many cases it reduces help by 7 or 8 persons! Very often, one person to feed and one to pack is all that is necessary and no special skills are required. You effect important material savings, too, for this wrapper uses only the minimum necessary to cover the product and seals without costly oversize seam laps. Trays and stiffeners are not required unless desired for the package rigidity some products demand. All in all, there's less waste and fewer returns with products packaged on the Campbell Wrapper.



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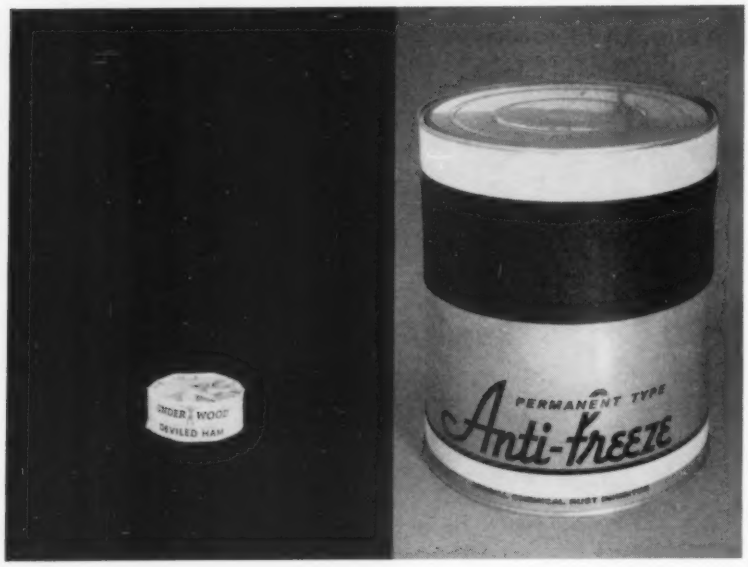
PMMI EXHIBITION—NEW YORK
NOV. 16-20

FLUIDICS* AT WORK



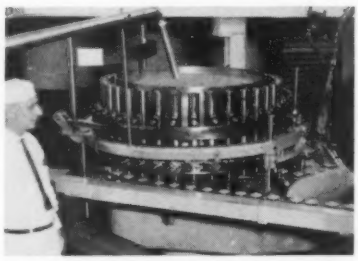
From mite to mighty . . . fill them all with Pfaudler fillers

Whatever size your container . . . #211 x 101.5 can or gallon; whatever your product . . . a spread like deviled ham or lightly fluid antifreeze, a Pfaudler rotary piston filler will handle it for you fast, at low cost and without spill.

The Wm. Underwood Co. at Watertown, Massachusetts, uses a Pfaudler RP-35 filler to package over 500 cans of viscous deviled ham a minute. Accuracy is held to ±1/10 fluid ounce—thus cans come off the filler clean.

A Southwestern petroleum manufacturer fills antifreeze at 60 to 80 *gallon* cans a minute using a seven-station Pfaudler machine. Similar results are common in citrus, soup, syrup and evaporated milk plants.

Simplicity of design is the all-important characteristic of Pfaudler fillers. Low maintenance—only four primary wearing parts. Fast cleaning—one man does a thorough job in just 30 minutes. High accuracy—precision adjustment even at full operating speeds. No product loss . . . positive acting no can-no fill mechanism.



Underwood Deviled Ham is filled at a rate of over 500 cpm, using this Pfaudler 35-station rotary piston filler.

For more information, write to our Pfaudler Division, Dept. PE-109, Rochester 3, New York. Or contact your Pfaudler representative.

*FLUIDICS is a new Pfaudler Permutit program that provides a modern, imaginative approach for handling and processing liquids and gases more profitably.

PFAUDLER PERMUTIT INC.
Specialists in FLUIDICS . . . the science of fluid processes

$1,313,038, a 14 per cent increase over $1,148,812 for the same 1958 period . . . For the six months ending June 30, 1959, **Minnesota Mining & Manufacturing Co.'s** sales were $210,701,892, compared with $176,261,592 for the same period a year ago. First half earnings were $27,437,746, compared with $17,646,665 for the same 1958 period.

Celanese Corp. of America reported 1959 first half sales of $127,578,050, compared to $103,787,203 during the same 1958 period. Net income for the first half of 1959 amounted to $10,445,088, an 83 per cent increase over the $5,701,345 earnings of the first six months last year . . . Improvement in operating efficiency, says **Stone Container Corp.**, enabled it to increase net income 39 per cent—from $703,615 for first six months of 1958 to $977,426 for the same 1959 period. In the first half of 1959, sales amounted to $19,710,469 as compared with $16,813,314 during the initial six months of 1958.

Sales of **Diamond Gardner Corp.** for the first six months of 1959 amounted to $91,923,000, compared with $81,170,000 for the same period a year ago. Net earnings for the six months ended June 30, 1959, totaled $4,008,000, compared with $3,577,000 for the corresponding period of 1958 . . . **Morningstar-Paisley, Inc.** reports net earnings for first six months of 1959 of $320, 509, compared with $250,911 for the same period in 1958. Sales for the 1959 six-month period amounted to $12,800,900, compared with $10,737,936 in 1958.

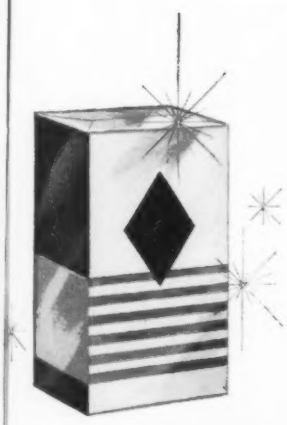
For the fiscal year ended May 30, 1959, **The Dow Chemical Co.** reports sales of $705,442,403 and net earnings of $62,916,016. Sales the previous fiscal year totaled $636,201,143, and net earnings were $46,059,181 . . . **Fibreboard Paper Products Corp.'s** earnings for the first half of 1959 were $2,714,777 and sales were $58,134,660. During the first six months of 1958 earnings were $2,051,231 and sales were $54,172,606.

What people are doing:

George A. Rutledge has been named Reynolds Metals Co.'s chief packaging application engineer . . . Container Corp. of America has announced that **Harry E. Miles,** vice president, will be in charge of all its corrugated shipping container plants, except West Coast properties. This represents a realignment of Mr. Miles' duties following the resignation of **Donald H. Brewer** as senior vice president. Also at Container, **Edwin A. Guerrero** is now Ohio Valley sales manager for folding cartons'. . . **Laurel G. Parkinson,** new general manager, marketing, of Amoco Chemicals Corp., has been elected a director.

New assistant sales manager for Pneumatic Scale Corp., Ltd. is **Robert W. Coughlin . . . Herbert L. Pease** has

WITCH TO PACKAGES THAT DO EVERYTHING FOR YOUR PRODUCT



SHINE SELL PROTECT

Alcoa® Wrap aluminum foil packaging is your answer. It gleams brilliantly, attracts more pick-me-up sales . . . it seals airtight foil-to-foil, or combines with laminants to assure double and triple product protection.

No wonder so many fine products now carry this label—

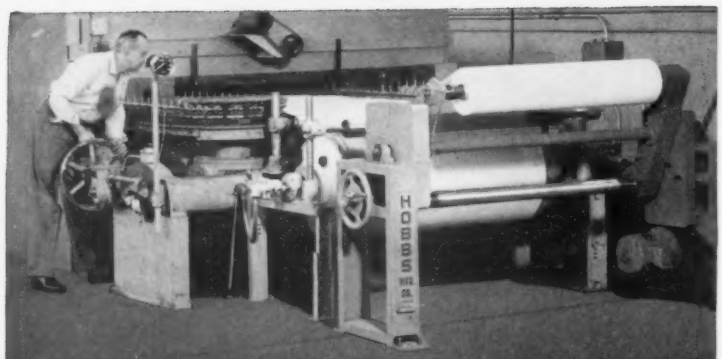
BETTER PACKAGING
ALCOA. WRAP
ALUMINUM COMPANY OF AMERICA

Exactly what does this label mean?

It means Alcoa, with the greatest fund of aluminum knowledge in the world . . . it means Alcoa, and converters, with full-scale packaging laboratories that can test ideas, check costs, answer all problems from design to package performance . . . it means Alcoa, teamed with converter specialists can provide so much more than any single company can—top facilities, top service, top know-how, all along the line.

Does your packaging need improving?

Whatever your plans or problems, we're all set to tackle them. Call your Alcoa salesman, or write: ALUMINUM COMPANY OF AMERICA, 1657-K Alcoa Building, Pittsburgh 19, Pennsylvania.



BUTTERWORTH Pioneers With

HOBBS-ALQUIST BATCHER, or WEB WINDER

The photograph herewith shows a Hobbs-Alquist Batcher, or Web Winder, on the end of a tenter dryer in the experimental laboratory of H. W. Butterworth & Sons Company, Bethayres, Pa.—a division of Van Norman Industries, Inc. The equipment is used to process webs of woven textiles, plastics, and paper and Mr. Stanley Brooks of Butterworth writes about the Hobbs-Alquist as follows:—

> "We would be perfectly willing to go on record that the winder has performed very satisfactorily, under very critical conditions, during a program entailing the winding of a broad variety of webs of material of different composition and characteristics."

A distinctive feature of the Hobbs-Alquist is that it utilizes a center drive instead of a surface drive. This eliminates friction on the web, which is highly important when delicate or sensitive webs are involved. At the same time tension control is maintained through the peculiar characteristics of the Hobbs-Alquist motor, which senses the increase in torque as the roll builds up and slows down in direct proportion.

The unit shown here is one of 9 different types of web winders and unwinders manufactured by Hobbs — each for a different set of requirements. Somewhere in this range of equipment is the winder or unwinder you need — the machine which gives you MORE FOR YOUR MONEY. Tell us your problem and let us make recommendations, free of all obligations.

WINDERS • WINDING STANDS • HAND & POWER SHEARS
SLITTERS • AUTOMATIC CUTTERS • DIE PRESSES

HOBBS

EST. 1903

Manufacturing Company
38J Salisbury St., Worcester 5, Mass.
Branch Offices & Representatives in Irvington, N. J., Chicago, Cleveland, Greenville, S. C., Louisville, Toronto and other principal cities.

44-9

been appointed sales manager of consumer foil products of Kaiser Aluminum & Chemical Sales, Inc. . . . Syntron Co.'s new executive vice president and general manager is **Byron K. Hartman** . . . **Dr. W. Paul Moeller** has joined AviSun Corp. as manager, special projects.

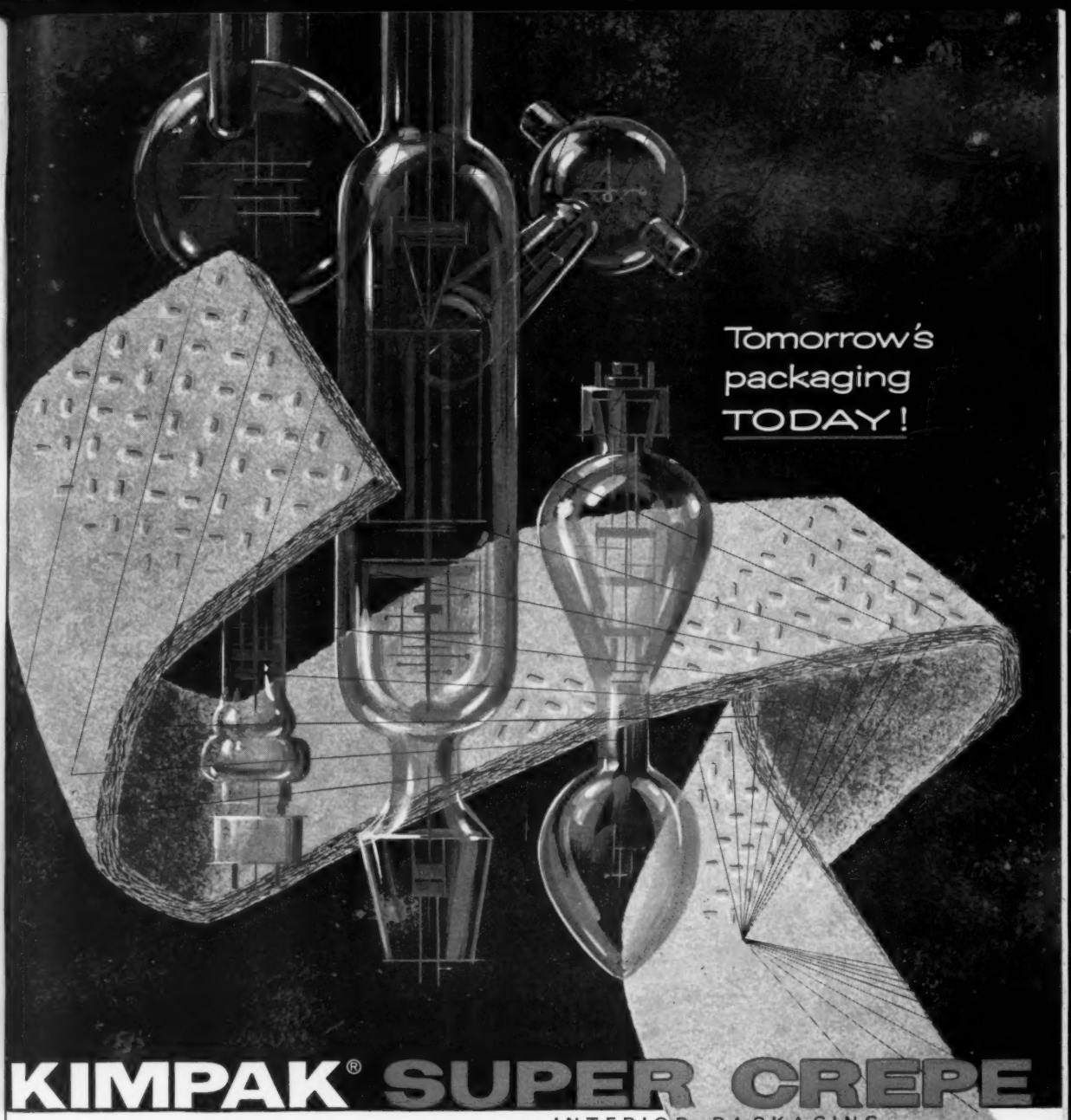
Regional production manager for Hinde & Dauch is now **Judson Mealy** . . . Three divisional vice presidents for the container division of Rheem Manufacturing Co. have been named—**William S. Goodfellow,** marketing; **C. R. Jones,** controller; **O. X. Pitney,** operations . . . The newly-created post of assistant general sales manager at Gilman Paper Co. will be filled by **H. D. Wellington** . . . **Robert Siegele** has been transferred from MRM Co., Inc.'s engineering to sales engineering department.

The Goodyear Tire & Rubber Co. has realigned its field sales organization. In the chemical division: **L. E. Stanton** has been transferred to Detroit as district manager; **R. W. Williams** is now West Coast district manager; **J. Platner** replaces Mr. Stanton as district manager at Houston, and **J.D. Hunter** is now district manager at St. Louis. In the films and flooring division: **C. E. Hixson** has been transferred to Chicago as district manager, and **P. E. Mulvehill** replaces Mr. Hixson as Dallas district manager.

Four new board directors of Nicolet Paper Corp. are: **Shy Rosen** of Milprint, **Hugh Cullman** and **Clifford H. Goldsmith** of Philip Morris Inc., and **Herbert B. Wenberg** of Nicolet . . . Continental Can Co. has made some changes in its sales personnel: **Lee Mason** is now general line sales manager of nonfood cans and steel containers, Eastern metal division; in the metal division, **S. B. Smart, Jr.** is general manager of mid-Eastern district, **David Wilson** replaces him as Milwaukee sales manager, and **T. V. Carley** succeeds Mr. Wilson as New York sales manager; in the paper container division, **William H. Stevenson** has been appointed Metropolitan New York sales manager.

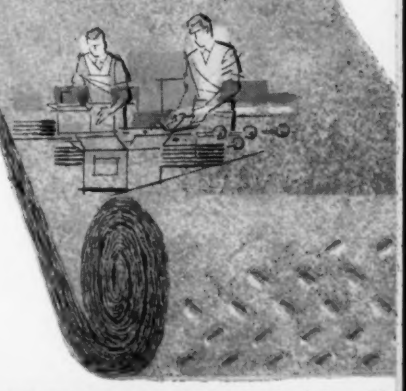
Specialty Converters, Inc. has elected **H. L. (Jess) Willard** president . . . At Bemis Bro. Bag Co., **B. L. Willmore** is now assistant to the vice president in charge of procurement and materials. Changes in Bemis' sales personnel—**R. V. Scott,** assistant director of sales, St. Louis; **A. F. G. Raikes,** director of Eastern operations; **J. B. Goolsby,** manager, New York sales division . . . Chippewa Plastics Co.'s general manager is now **George Dingman.**

Fibreboard Paper Products Corp. has named **Allen C. Wilcox, Jr.** general manager of its newly-created Hawaii packaging division. **H. C. (Buzz) Hamlin, Jr.** is now sales manager for Fibreboard's Northern packaging division . . . Two new senior development chemists at



KIMPAK® SUPER CREPE

INTERIOR PACKAGING



Improved cushioning material with new-product performance.
More spring . . . more shock absorption . . . lower price.
Regular Kimpak quality . . . complete range of selections.
Ideal tie-in with your company's cost reduction program.

Immediately available from your packaging material or coarse paper supply house. Call your merchant, today!

Kimberly Clark
INTERIOR PACKAGING
KIMPAK

KIMPAK is a trademark of KIMBERLY-CLARK CORPORATION

For more information circle No. 211 on Reader Service Card, Page 96

The Nitragin Company, Milwaukee, Wisconsin, world's largest producer of legume innoculants for agriculture, uses the above Hayssen Compak with elevator feed to form, fill and seal their new moisture-seal poly package. Packaging material costs alone have been reduced 66%.

OTHER ADVANTAGES REALIZED WITH HAYSSEN COMPAK AUTOMATIC PACKAGING

- **SPACE SAVED** — Full year's supply of roll poly stored in area formerly required for 3 month's supply of cans. *Twenty-five percent less storage area used for poly-packed product than for equal amount of canned product.*
- **LABOR REDUCED** — 43% less labor required to form, fill and seal packages on the Compak line than was used to produce an equal number of packages on the can filling line.
- **LESS HANDLING AND SHIPPING COSTS** — More packages per carton give the company an added savings in cartoning, handling and shipping their product.
- **GREATER CUSTOMER ACCEPTANCE** — Dealers, distributors like the new flexible package that gives them new handling and storage economies of their own.

Good reasons why manufacturers everywhere consult Hayssen for their packaging problems. Why don't you call today!

THIS IS OUR 50th YEAR AT

HAYSSEN

MANUFACTURING CO. • DEPT. PE 111 • SHEBOYGAN, WIS.

Offices in principal cities. Check your phone directory.

Atlanta • Boston • Chicago • Dallas • Denver • Detroit • Jackson, Miss. • Kansas City • Los Angeles
Minneapolis • New York • Philadelphia • St. Louis • San Francisco • Montreal • Toronto • Vancouver

14 For more information circle No. 212 on Reader Service Card, Page 97

National Starch and Chemical Corp. are **John M. Coffey** and **Robert S. Forsyth** . . . At Crown Zellerbach Corp. **Leslie W. Gould** has been appointed assistant vice president and manager of its Eastern division; **William L. Meyer** is controller; **Raymond O. Jones** is now assistant to vice president for packaging operations in San Francisco; **Louis J. Liati** and **M. Robert Boss** have been named Los Angeles sales managers.

Inland Steel Container Co. has elected **Ralph G. Mehler** vice president in charge of operations . . . Crossett Paper Mills' new sales office in Atlanta, Ga. will be headed by **John Twyman Allen.** In organizing its new production department, Crossett has promoted **W. B. Jenkins** to assistant mill manager of kraft operation; **F. E. Woods** to assistant mill manager of bleached food board mill, and **A. G. McCaughan** to kraft paper mill superintendent . . . **Robert G. Hess** is now president and general manager of Wright Machinery Co., a division of Sperry Rand Corp.

Columbia Box Board Mills, Inc. has named **O. P. Fussell** special assistant to the executive vice president . . . Marathon, American Can Co., has created two new positions—**Charles J. Lingelbach** is now assistant director of commercial development department and **Vincent C. Jones,** manager of product planning, specialty packaging. American Can International, Inc. has named **R. S. Peters** plant manager of Metalgrafica Canco, S.A., Sao Paulo, Brazil . . . The newly-created sales development department for container sealing compounds of Dewey and Almy Chemical Div., W. R. Grace & Co., will be managed by **Robert A. Clabault.**

Federal Paper Board Co., Inc. has promoted **Raymond W. Marshall** to resident manager of its folding box division. Federal has also announced two new plant superintendents—**Richard Buck,** Lindley Box & Paper Div., and **Otto Ohliger,** Morris Paper Mills . . . **Parker McKinley Bitner** is now plant manager at Knox Glass, Inc. . . . Union Carbide Corp., has named **Robert D. West** aerosol formulation chemist . . . **Joseph P. Corbin** has been named to the staff of the general manager, pulp and paper division, St. Regis Paper Co.

Three promotions at Dow Corning Corp. are: **William W. Pedersen** is now a member of a new corporate planning committee in Midland; **Max H. Leavenworth** replaces him as manager of the Cleveland sales, and **Edwin Haire** replaces Mr. Leavenworth as Dallas manager . . . **Tom G. Coleman** has joined Owens-Illinois Glass Co. as purchasing agent for the administrative division . . . Crown Cork & Seal Co., Inc. has elected **Edward P. Stuart** a vice president . . . **Lonnie P. Lawrence** is now carton sales representative for Olin Mathieson's packaging division. *(End)*

Circle No. 213 on Card, Page 97

GAYLORD GIVES LOCAL SERVICE
ALL OVER THE PACKAGING MAP

At every important packaging crossroads, coast to coast,
there's a Gaylord Container plant or office to serve you.
Your inquiry brings a quick reply — with no detours
through channels or over mountains of red tape.

Avoid the byroads. Take the high road to full packaging flexibility.
Go Gaylord. Call your friendly nearby G-Man today.

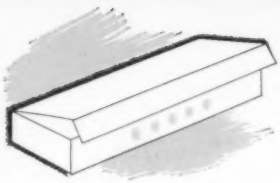
GAYLORD
CONTAINER CORPORATION

Gaylord Boxes

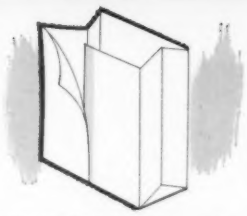
HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**

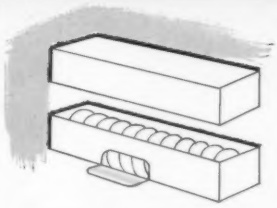
HOW THERMOGRIP® ADHESIVES ...Cracked six production bottlenecks



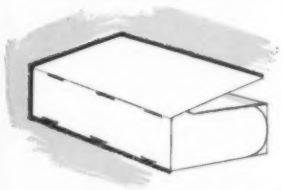
FASTER CLOSING, immediate handling, fewer closing lines on cigarette cartons. Carton can be opened without tearing for tax stamping. Production increased. Long pressure-drying sections avoided.



FAST SETTING, bag makers avoid squeeze-out — find increased machine speeds, less waste, improved product and production savings of 8-20% are just part of the gains made with THERMOGRIP.

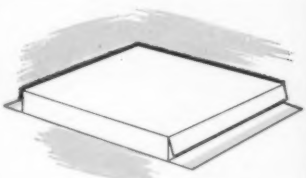


POSITIVE CARTON CLOSURE. THERMOGRIP on die-cut side flap sets fast, holds cover in place — eliminates 30 feet of pressure section — affords immediate handling — bonds foils and plastic coatings, too!



MULTIPACK MACHINE design is more compact, eliminates long pressure section, provides cleaner, more controllable adhesive system, immediate automatic removal of glued packs.

REGISTRATION ACCURACY for convertors. Production doubled, staples eliminated with THERMOGRIP on multiple part continuous business forms, saves many dollars per hour.



BEAT FIGHT in stiff boards on book and waxed food cartons with THERMOGRIP. Better control, easier to use, more compact adhesive system and good bond in split second.

Instant bond on wide range of materials with THERMOGRIP adhesive gives you a control over tricky gluing jobs — lets you speed up operations. It's the only adhesive which comes in a dry, cord-like form for ease of handling and application.

In addition, you have a choice of six different applicators that can apply THERMOGRIP in dots, dashes or unbroken strip — to continuous webs or individual items. These are highly engineered units backed by more than 50 years' experience in the design and service of dependable production machinery.

Many firms are making spectacular dollar production savings. Others enjoy increased speed and cleanliness. Some jobs on hard-to-stick materials are being done with THERMOGRIP that are not possible any other way. Investigate THERMOGRIP today and see whether its many benefits can be yours! UNITED SHOE MACHINERY CORPORATION, 140 Federal Street, Boston 11, Mass., LIberty 2-9100.

United

A Machine Test on Bread Packaging . . . typical of hundreds conducted on actual production-line equipment at Du Pont's Film Department Mechanical Development Laboratory.

Tests like this help Du Pont develop cellophanes that assure you top production speeds and efficiency

Bread—60 loaves a minute. Cigarettes—up to 275 packs a minute. Twist wrap candies—450 a minute. For direct wraps, overwrapping, bag making and filling and a variety of other automatic and semiautomatic applications, cellophane assures you top speeds and efficiency.

The reason: cellophane's unique balance of properties that makes it the most versatile packaging material you can use. It is static-free . . . has a wide heat-sealing range . . . gives a clean operation. It is flexible yet has a rigidity that helps give top machine performance.

Tests like the one shown above assure that you get the cellophane tailored to meet *your* needs . . . when you specify Du Pont cellophane by code designation.

When you need help, call your Du Pont Technical Representative. He is your best source of service. His reference folder, "Properties and Uses of Cellophane", can be useful to you. Ask him for a copy or write direct to E. I. du Pont de Nemours & Co. (Inc.), Film Dept. PE-7, Nemours Bldg., Wilmington 98, Del.

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

DU PONT cellophane

SUNDSTRAND

PACKMASTER MODEL 50

Either a pusher feeder or dial feed can be provided to produce up to 80 square or rectangular heat-sealed packages per minute. Size of packages ranges from 2 x 3 inches to 6 x 6 inches using various combinations of transparent and opaque papers. Hopper feeds can be provided for automatic operation.

for Hardgoods, Liquids and Powders in Envelopes, Wrap or Blister Pack

PACKMASTER MODEL 58

Thermoformed domes or blisters conform to part being packaged at rate of 60 per minute for 4 x 4 inch package, even faster for smaller units. Trade-marks, symbols, etc., can be formed at same time package is shaped. Drum unit forming packages is designed for rapid change-over.

PACKMASTER MODEL 56

Long workpieces from ¼ to 2 inches thick, including those with irregular shapes, can be packaged in closely conforming cohesive paper up to 24 inches wide. Typical parts handled include automotive grilles, extrusions, telephone bases, etc. Machine adjusts automatically to change in part length, permitting handling of several different parts in a single run.

See these machines in Booths 318 and 720 at the Packaging Machinery Manufacturers Institute.

More Data *is available on all Packmaster and Brown Filling Machines described on these pages by writing to...*

Packaging Equipment

Modern, efficient packaging equipment built by Sundstrand provides a sure way to cut costs on an extremely broad range of work. Two basic machine lines — Packmaster and Brown Filling Machines — plus the experience of Sundstrand packaging engineers assure you a solution that really fits your needs.

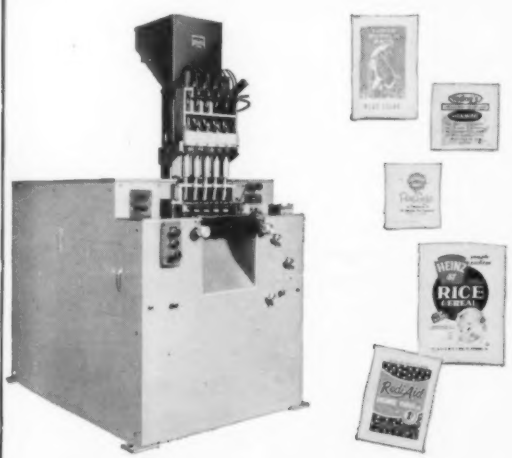
Thermoformed plastic, cohesive paper, heat-sealing papers, foils, films, and laminates are used as packaging materials by the various machines in the complete Sundstrand line. Machines are available for forming packages with perfect electric-eye registration of both sides using printed papers while others can print serial numbers, specifications, and similar data.

BROWN MULTIPLE PACKETER

Forming, filling, and heat-sealing are performed in one continuous cycle on packets measuring up to 8 x 9 inches. As many as 8 packets are handled per cycle at a rate of 25 to 50 cycles per minute. Electric-eye registration with printing on both sides assures perfectly centered trade-marks, instructions, etc.

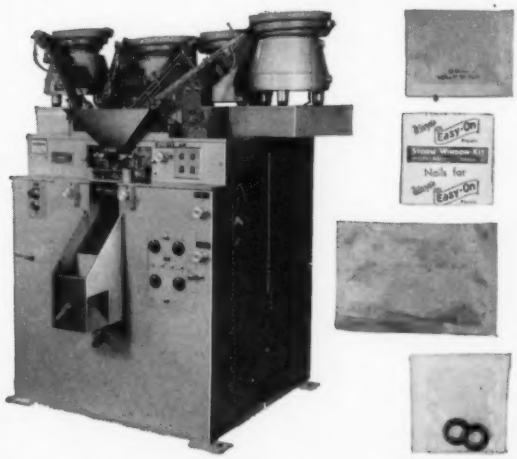
BROWN MULTIPLE FORMAPAK

From 2 to 7 packets are formed simultaneously, filled, and sealed in every cycle with 50 to 100 cycles per minute depending on powder being handled and characteristics of packet material. Plungers place powder in packet eliminating imperfect seals from dusting even at production rate topping 30,000 packets per hour.



BROWN HARDWARE FORMAPAK

Screws, nuts, bolts, washers, nails and similar items are automatically fed, counted, wrapped, and sealed. Complete range of heat-sealing papers and various laminates can be either preprinted or coded by the machine. Output rate is up to 100 packets per minute, each containing the correct number of units.



SUNDSTRAND

SUNDSTRAND PACKAGING EQUIPMENT

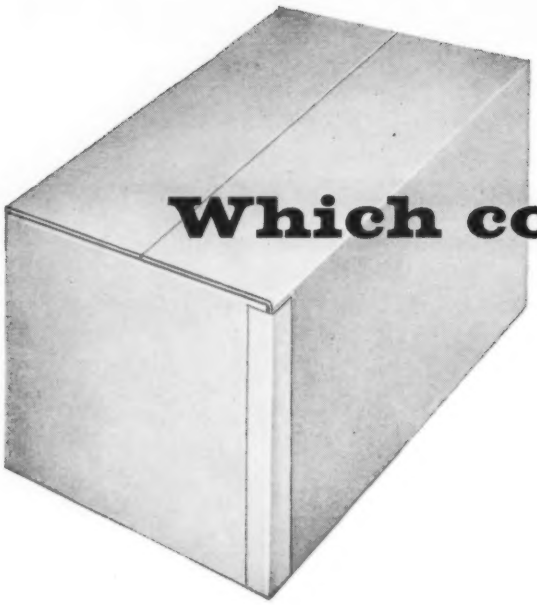
SUNDSTRAND-AMERICAN BROACH

Division of SUNDSTRAND CORPORATION • Ann Arbor, Michigan

Manufacturers and distributors of Packmaster and Brown Filling Machines

For more information circle No. 216 on Reader Service Card, Page 97

What you should know about "manufacturer's joints" in Union Boxes.



Which corner of a box s

One corner is more important than the rest: where your corrugated shipping container is held together. This "hinge", or manufacturer's joint, often holds the key to your box's performance.

As the illustrations show, manufacturer's joints comprise three basic types: taped, stitched, and glued-lap. Each does a special job. Knowing which to use, and when, calls for a detailed analysis of your product and how it will be shipped.

Union Box engineers will be glad to make such a study for you. This is part of Union's complete structural design service. These fundamentals, however, are excellent guides:

Many shippers prefer tape

Taped Joint
(outside)

Tape is generally gum-backed, reinforced kraft paper or cloth, having high tear strength, especially in the lengthwise direction. Tapes are 2, 2½ and 3 inches wide and come in varying grades depending on degree of strength required.

For more information circle No. 217 on Reader Service Card, Page 97

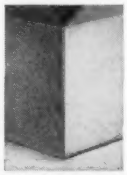
x should you examine first?

Advantages: no projections. In stacking, boxes lie flat, rock less. Also, entire interior area of box can be used. The taped joint is continuous, too . . . seals out dust and dirt. And it folds to make a true box corner.

On the other hand, tape is frequently more expensive than other manufacturer's joints. It can be adversely affected by moisture also. In some cases, tape may interfere with printing.

The sturdy stitch

Frequently used for heavy items like canned goods, this joint uses steel staples driven from the outside of the box panel. It is probably the strongest "hinge", gives the most positive closure, and is not affected by moisture or cold. It is usually the least expensive.



Stitched Joint (outside)

The closure, however, is not continuous. And, since the metal stitches may protrude inside the box, this joint is normally not recommended for fragile and prone-to-scratch articles.

The diagonal stitched joint shown is a typical arrangement. Others include vertical, horizontal, and double stitching.

Glued lap . . . the versatile joint

Flap may be adhered either to the inside or outside of the box, and to the end or side panel. Inside-flap gluing is the most popular. It is the only joint which leaves a completely uninterrupted exterior printing surface.

Like the taped joint, the glued lap joint is continuous . . . forms a true fold. Performance under adverse moisture conditions is questionable. Also, inside-lap does not give 100% clear inside-packing area.

Glued Lap Joint (inside)

Take full advantage of Union's accumulated knowledge in constructing and recommending manufacturer's joints for shippers in every industry. Consistently well-engineered features such as these offer the surest protection for your product and your shipping investment.

Write for Union's free, informative booklet "Manufacturing Corrugated Boxes."

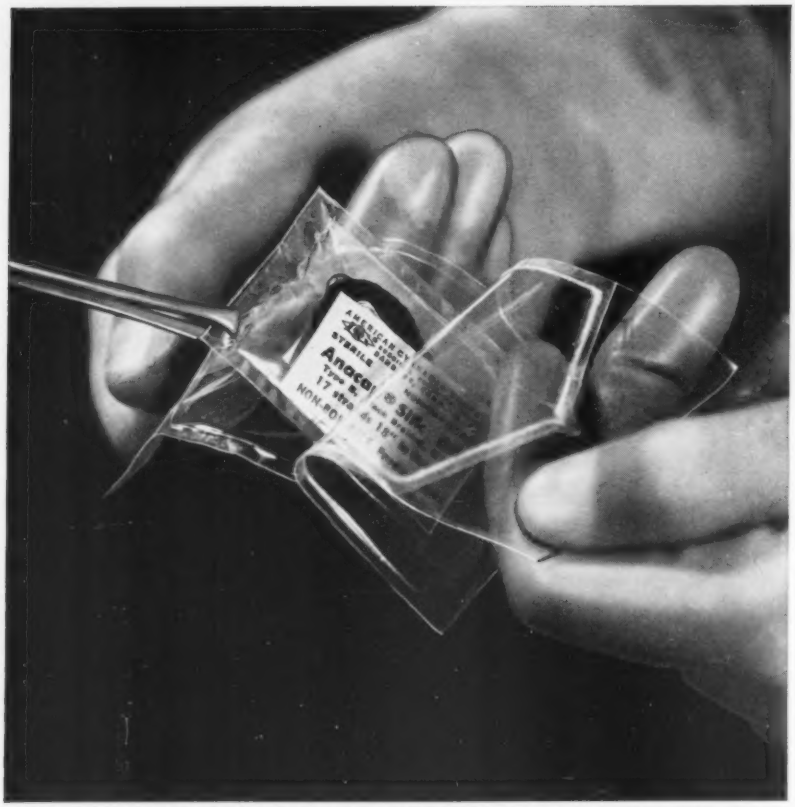
union camp

UNION BOXES

UNION BAG-CAMP PAPER Corporation
233 BROADWAY, NEW YORK 7, N. Y.

Factories: *Savannah, Ga.; Trenton, N.J.; Chicago, Ill.; Lakeland, Fla.*

Sales Offices: *Eastern Division—1400 E. State Street, Trenton, N.J.*
Southern Division—P.O. Box 570, Savannah, Ga.; P.O. Box 454, Lakeland, Fla.
Western Division—4545 W. Palmer, Chicago, Ill.



SEALED IN ALCOHOL, sterile sutures stay sealed for as long as 3 years in envelopes of "Scotchpak" Brand Heat-Sealable Polyester Film. Paks can be stripped open easily in the operating room—and there's no danger from broken glass.

"SCOTCHPAK" TAKES OVER

...streamlines a multitude of packaging jobs!

Looking for a film that's *tough*, clear as glass—one you can freeze or boil? And would you like that same film to be heat-sealable with a seal that's as tough as the film itself? Then your answer is "Scotchpak."

Here is a film that combines the best features of many films. It can be heat-sealed in less than 2 seconds —a temperature of 300° to 400° F. and 20-60 psi is all that's required.

"Scotchpak" Film resists freezing cold (down to -70°F.) and boiling heat (up to 240°F.). It resists acids, oils, alkalies and organic solvents. It is light (saves shipping costs!) and compact (saves space in shipping and on the shelf, too!)

"Scotchpak" is now available in roll-stock widths up to 50 inches—from 2 mils to 4.5 mils thick, ready for printing—if you desire. It can be easily handled on conventional bag-making and filling equipment.

Our Customer Service organization is ready to work with you to show you how "Scotchpak" can solve your film fabrication and packaging problems. For complete information, write Film Products Group, Dept. CAS-109, 3M Company, St. Paul 6, Minnesota.

SCOTCHPAK BRAND

SCOTCHPAK BRAND

SCOTCHPAK BRAND

SCOTCHPAK BRAND

SCOTCHPAK BRAND

SCOTCHPAK BRAND

SCOTCHPAK BRAND

SCOTCHPAK BRAND

SCOTCHPAK BRAND
HEAT-SEALABLE POLYESTER FILM

SCOTCHPAK BRAND

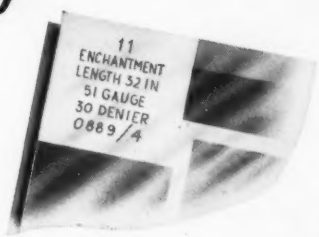
"SCOTCHPAK" IS A REGISTERED TRADEMARK FOR THE HEAT-SEALABLE POLYESTER FILM OF 3M CO., ST. PAUL 6, MINN. EXPORT: 99 PARK AVE., NEW YORK 16. CANADA: LONDON, ONTARIO

MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

Imprint specifications
... easily, cheaply



Thousands of manufacturers save time, reduce packaging costs and wastes, by Tickometer imprinting.

If your production involves a range of sizes, colors and weights, pre-printing the data on the assorted packages calls for careful estimating; and an expensive printing job that involves a high percentage of press down-time and frequent set-up changes. Then, you add a percentage of overrun for spoilage and accidents—even though most of the overrun may be wasted.

With a Tickometer, you buy only the basic packages – and imprint your specifications or designations, as required, by quick changes of Tickometer imprint plates. Speedily run off the quantity needed. Packaging can be prepared for daily production, special assortments, etc.

A Tickometer can handle a lot of packages in a hurry – imprints up to 1,000 pieces a minute. Gives a good impression on most standard weights and finishes of paper or light card stocks. Takes sizes as small as 1 by 2 inches, up to 15 by 15, depending on the model. Imprints up to 2-3/16 by 7/8 surface. Feeds and stacks automatically.

The Tickometer also counts – *so accurately that banks even use it to count currency*. Can make a predetermined count, register part and full totals; and with an accessory, do consecutive numbering.

Has many other applications; is used to mark, stamp, cancel, endorse or sign checks, cards, coupons, tickets, tags, sales slips, forms, etc. . . . with amazing time savings over hand work. The Tickometer can be rented or bought. And Pitney-Bowes service is available from 304 points.

Call the nearest PB office for a demonstration. Or send coupon for free illustrated booklet and case studies.

Pitney-Bowes

TICKOMETER

Imprinting & Counting Machine

Made by the originator of the postage meter . . . offices in 121 cities in U. S. and Canada.

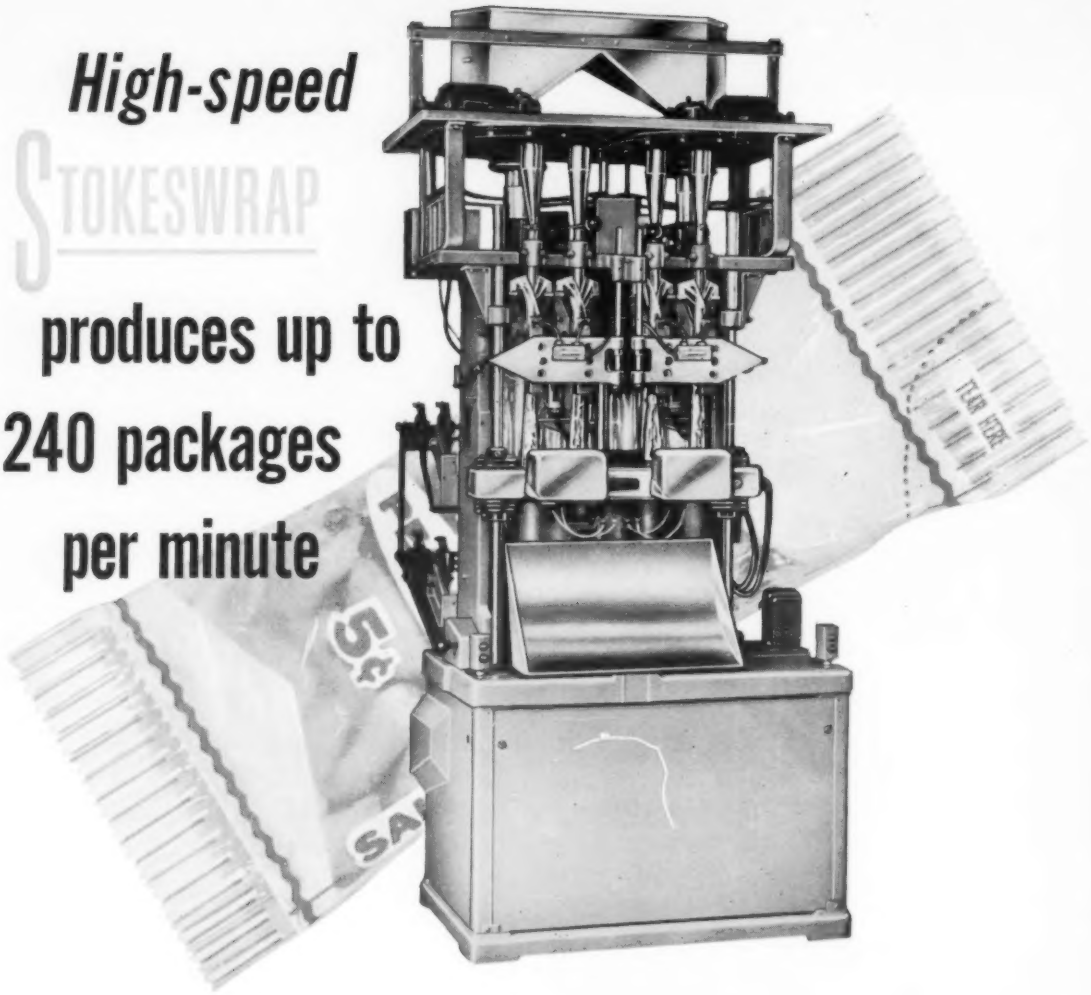
PITNEY-BOWES, INC.
7731 Walnut Street
Stamford, Conn.

Send Tickometer booklet and case studies.

*Name*_____

*Address*_____

High-speed STOKESWRAP produces up to 240 packages per minute



Designed to deliver maximum production in minimum space, the new four-tube Stokeswrap can form, fill and seal as many as 240 flexible packages per minute. One four-tube Stokeswrap costs less than . . . yet equals the output of . . . two conventional two-tube units. It is ideally suited for plants where floor space is limited, where increased production is desired and a replacement for obsolete equipment.

Depending on requirements, the four-tube Stokeswrap will form "pillow" or "four seal" types of packages from printed or unprinted roll stock of most heat sealable materials and laminations. Each tube has its own electric eye registration to assure proper positioning of the package design. Either conventional or impulse sealing can be provided with sealing and cut-off achieved in one simple operation. Webs are held in constant tension to eliminate jamming and other troublesome operations.

Capacities range from one gram to three ounces depending on product characteristics. Package sizes can be handled up to 2⅜" x 6¾". Special attachments for strip packaging, gas-fill packaging, coding, imprinting and hole punching can be supplied.

For complete information, write to:

Putting Ideas to Work

FOOD MACHINERY AND CHEMICAL CORPORATION

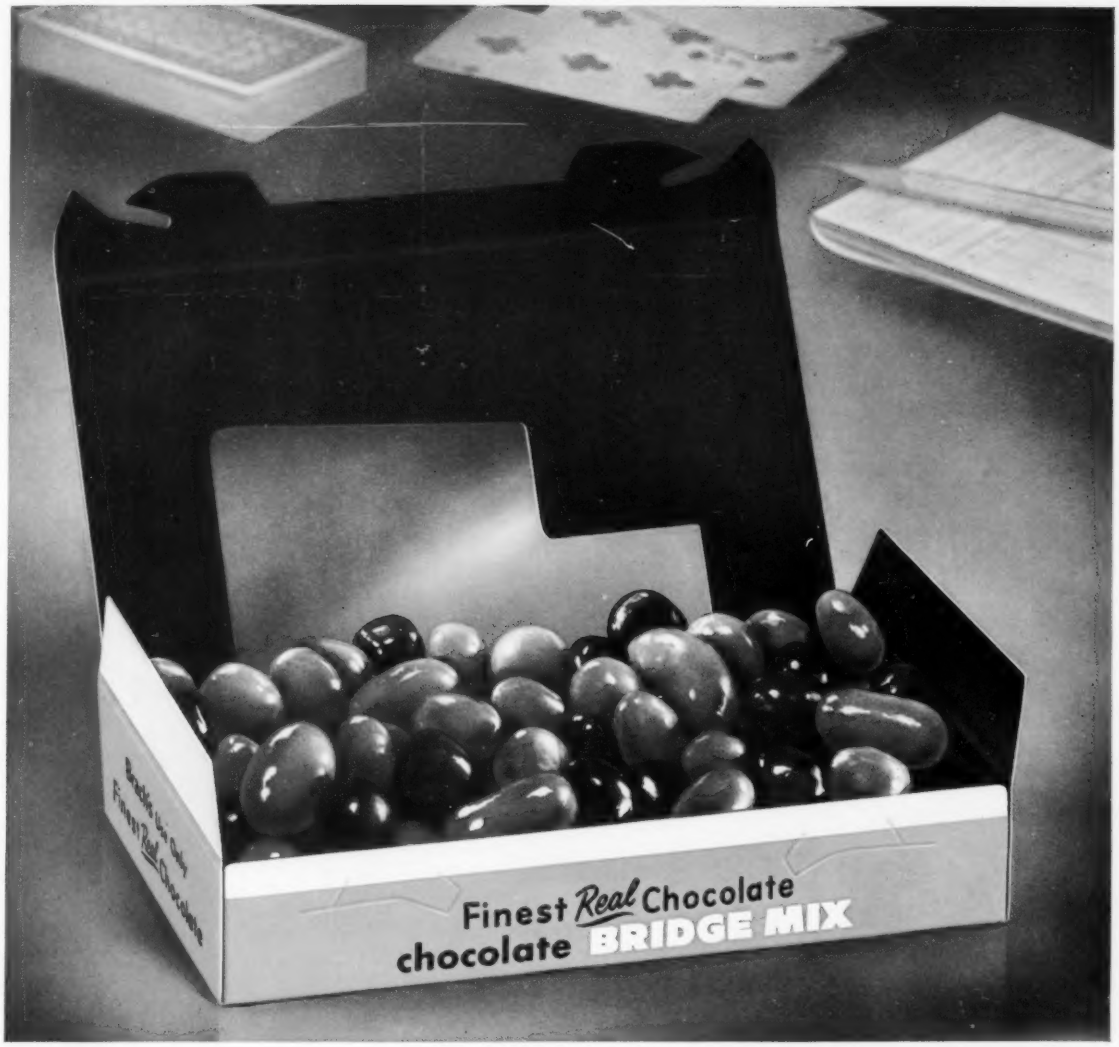
FMC Packaging Machinery Division

Stokes & Smith Plant

4994 SUMMERDALE AVENUE, PHILADELPHIA 24, PA.

For more information circle No. 220 on Reader Service Card, Page 97

Circle No. 221 on Card, Page 97



Inside Protection with a Flair

How? E. J. Brach & Sons, Chicago, use Rhinelander's board-lining chocolate Glassine paper. Package designers found that, when Rhinelander Glassine is laminated to box board, chocolate oils can't seep through, messy staining is prevented, and the candy contents keep their appetizing Come-Hither-ness.

Brach finds Rhinelander Glassine tops for other candy packaging jobs, such as fluted bonbon cups and candy trays.

Among its other advantages, Rhinelander Glassine is low in price and handles with remarkable ease on high speed automatic packaging machines.

If your quality product needs maximum protection . . . *with a flair* that entices sales . . . look into economical Rhinelander Glassine or Greaseproof papers. And a range of attractive colors can complement the appearance of the product. *Write today* for more information and samples, stating your application.

Rhinelander
PAPER COMPANY • RHINELANDER, WISCONSIN
Division of St. Regis Paper Company

International AIR BOXER *Provides "PORTABLE CARTON-CLOSING DEPT."*

This lightweight, air-operated unit has become a versatile "standby" stapler for peak load periods... is instantly adaptable to any size or shape carton. Non-fatiguing trigger action is appreciated by operator. It makes the same neat, strong closure characteristic of the other International Staplers. This Air Boxer's investment was recovered in about 6 months.

International END STAPLER
Replaces Two Slower Operations

Previous to the END STAPLER installation, carton bottom flaps were closed by one closure method and top flaps by another. Steel staples now close both tops and bottoms. The result is a strong, neat package that stores well, ships safely and is unaffected by humidity. The unit has paid for itself in just 2 months!

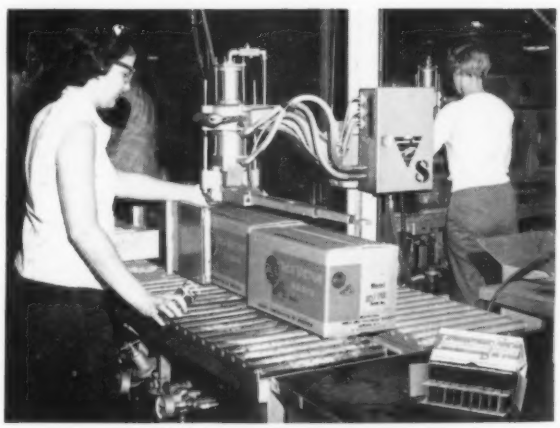
RCA REPLACES OTHER CARTON CLOSURE METHODS

with International Stapling Machine Program

Labor and Material Savings Pay for Equipment in Less than 6 Months' Average

International Staplers are now an important part of the newly streamlined packaging operation of the Radio Corporation of America. Operations in each area of Installation have resulted in significant increases in labor efficiency and decreases in material costs.

For additional information on these Staplers, or others in the complete International line, write us or contact your International Representative.



International DUAL STAPLER
Closes Carton Tops & Bottoms In One Operation

In just one simple, accurate 3-second cycle, the DUAL STAPLER securely staples *both* top and bottom flaps of the RCA cartons from the outside—after the cartons have been filled. This has eliminated pre-assembled set-up boxes as required by previous methods. The unit has paid for itself in little over half a year.

International Staplers

INTERNATIONAL STAPLE & MACHINE COMPANY
P. O. BOX 270 • HERRIN, ILLINOIS

Originators of Carton Closing Staplers

are you still designing square packages for round products?

LET KEYES PRODUCT DEVELOPMENT ENGINEERS SHOW YOU HOW MOLDED CONTOUR PACKAGING CAN CUT COSTS, BREAKAGE

Molded pulp is the one inexpensive packaging material that combines rigidity with remarkable cushioning properties. Contour packaging eliminates fillers and dividers, cuts packing costs to a minimum. Molded pulp contour packaging facilitates automation . . . reduces cubage, saving valuable warehouse and shipping space.

Keyes molded pulp contour packaging has solved shipping and breakage problems for dozens of hard-to-package products including eggs, glassware, fruit, lamps and electrical parts. This experience, together with complete, modern production facilities means that Keyes can develop and produce for you custom designed packaging that cuts costs, reduces breakage.

For free consultation on your packaging problems write:

Product Development Division, Dept. PE-10

KEYES FIBRE COMPANY
Waterville, Maine

KEYES ® MOLDED PRODUCTS

A message of importance to all food packagers affected by the New Food Additives amendment

Many packagers are concerned about meeting the requirements of the 1958 Food Additives Amendment to the Federal Food, Drug and Cosmetic Act. The new regulation prohibits "the use in food of additives which have not been adequately tested to establish their safety."

Any compound in a packaging material is under question if it migrates to the food product. The burden of responsibility in the use of materials is now on the packager.

CELANESE OFFERS F.D.A. ACCEPTED PACKAGING FILM AND SHEETING NOW!

Celanese, some time ago, reviewed with the Food and Drug Administration the composition of various acetate films and their suitability for packaging foods. Years of animal feeding tests were made on a key ingredient at the request of the F.D.A. to establish the safety of this ingredient. The result of this work proved the safety of the ingredient, and enabled the F.D.A. to accept these special film compositions.

P903, P904, P912 — Cast films noted for clarity and perfection of surface.

S600, S603, S650, S653 — Extruded films having good surface characteristics although not as optically clear as P900 Series.

S732 — Extruded Sheeting having good surface characteristics. Semi-rigid, but can be thermoformed and otherwise fabricated.

To assist processors in the selection of F.D.A. accepted packaging, Celanese has prepared an informative folder covering Celanese Acetate Film for acceptable food packaging. For your copy, return coupon on opposite page.

Celanese Corporation of America, Plastics Div., 744 Broad St., Newark 2, N. J. Celanese®

Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver.
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., New York 16.

Celanese ACETATE SHEETING AND FILM

For more information circle No. 224 on Reader Service Card, Page 97

Celanese ACETATE...

ideal for food packaging

Celanese Acetate is known in the food field as the "breathing wrap". Although waterproof—remaining crisp when wet—it is permeable to moisture vapor, carbon dioxide and other gases of food metabolism. This property is vital to the correct packaging of fresh vegetables and fruits. This "breathing" quality of acetate films contributes to a fog-free, sparkling food package—resistant to the growth of mold and fungi. It is also highly greaseproof.

Celanese Acetate has good dimensional stability, excellent printability, and long shelf life. It is easily fabricated into packages and containers by both manual and machine packaging operations. Types of food packages made with the film include window boxes, window bags, overwraps for use in direct contact with food, window envelopes, and window cartons. Acetate sheeting is used for transparent rigid containers, telescope and sliding lids, blister and skin packs.

New folder describes types of acetate film and sheeting available from Celanese and how you can use them in food packaging.

Celanese Corporation of America, Plastics Division,
Dept. 105-J, 744 Broad Street, Newark 2, N. J.

Please send me folder, "Celanese Acetate Film and Sheeting for F.D.A.-Acceptable Food Packaging".

Name_____

Title_____

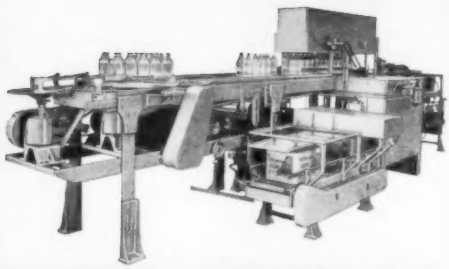
Company_____

Address_____

City_____ State_____

STANDARD-KNAPP CASE UNLOADERS

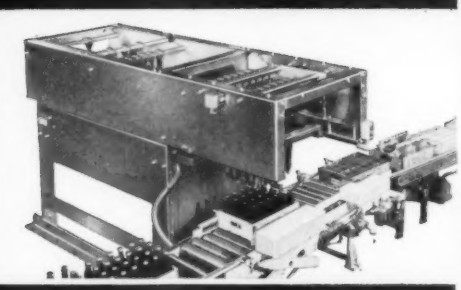
New unit developed to handle glass containers packed and shipped upside down in corrugated cases. Containers are gripped on their bottoms and lifted clear of the case before being inverted to upright position. Carton debris cannot enter.



STANDARD-KNAPP CASE LOADERS

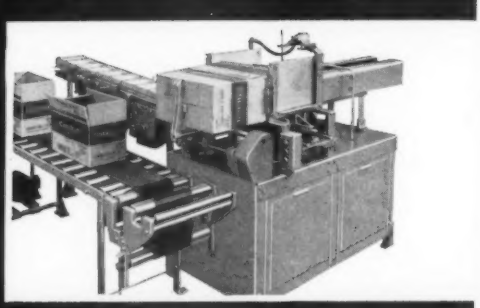
BOTTLE AND CAN

Type 860 Packer takes 27% less space, provides 40% more capacity than previous models. Cycles at speeds up to 30 cases per minute. Rapid change-over. Automatic or semi-automatic case feed.



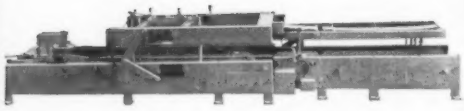
PACKAGE AND BAG

Mechanical and pneumatic types. Handle packages as soft as lb. bags of coffee, as weighty as 10 lbs. of sugar, as bulky as toilet tissue, as firm as detergent cartons, as small as soap.



STANDARD-KNAPP CASE GLUERS and SEALERS

Wide range of models, featuring quick positive adjustment to varying case sizes (some types have automatic adjustment), easily removed glue pots and rollers, accurate control of glue film by calibrated mechanism.



OTHER STANDARD-KNAPP EQUIPMENT

Labelers • Collectors • Boosters • Case Printers
Flap Openers • Unscramblers • Dumpers • Conveyors

EMHART

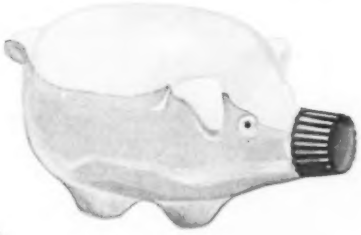
Emhart Manufacturing Company
Portland, Connecticut
Standard-Knapp Packaging Equipment

For more information circle No. 225 on Reader Service Card, Page 97

CREATIVE

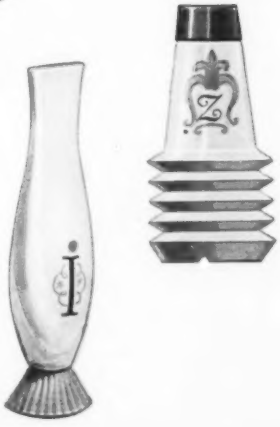
Wirz packaging specialists work wonders with plastics. Design consultants are prepared to add new product protection, user convenience and sales appeal to distinctive containers for drugs, cosmetics, industrial and household items . . . in either stock sizes or in custom designs.

PACKAGING



Package size and shape, color variety and decorating possibilities are virtually unlimited. Experienced craftsmen assure precision container quality. The wide scope of Wirz techniques permit tailor made package design in your choice of required plastic and metal packaging materials.

BY WIRZ



POLYETHYLENE BOTTLES

PVC TUBES • PLASTIC AND ALUMINUM AEROSOLS

COLLAPSIBLE METAL TUBES

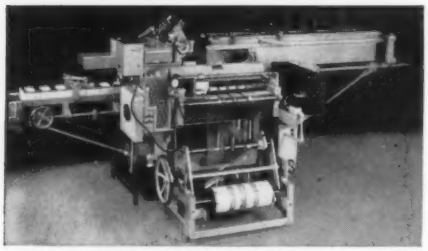
CREATIVE PACKAGING BY WIRZ
PROMOTES PRODUCT SALES

A. H. WIRZ INC.

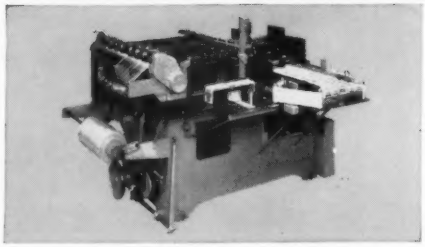
4th & IRWIN STREETS, CHESTER, PA.

Plants in Carrollton, Kentucky & Swedesboro, N. J.
Sales Offices: New York • Chicago • Los Angeles • Memphis • Havana

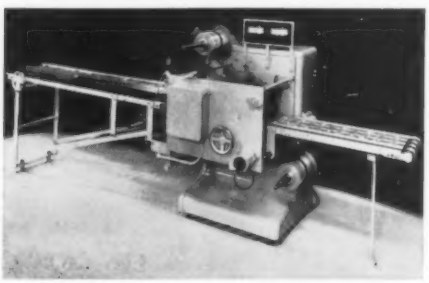
ALSO • RIGID CANS AND IMPACT EXTRUSIONS • AMERICAN EXTRUSION DIVISION



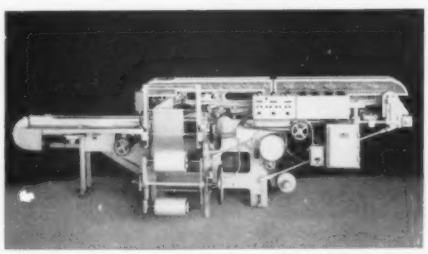
NOW YOU CAN HAVE TOMORROW'S OVER-WRAPPING MACHINE TODAY! Battle Creek's completely new Model 475 successfully handles more than 40 different formulations of soft plastic film . . . your assurance new plastic film developments will not outdate this machine. Change of films requires only electronic heat adjustment. Size changes are made in 15 minutes. Wraps up to 75 per minute within 5″ to 12″ lengths, 3″ to 8½″ widths and ¼″ to 4″ heights. Choose any of these films — polyethylene (medium, low and high density 1 mil and up), polystyrenes, heat sealing cellulose acetates, heat sealing foils, polyvinyl chlorides, cellophanes, polypropylenes or polymer coated films. **Battle Creek *"Continuous Flow"* Packaging Machines, Inc., Battle Creek, Michigan.**



REDUCE COSTS . . . PROTECT PRODUCTS . . . IMPROVE DISPLAYS . . . PROMOTE MULTIPLE SALES with Battle Creek's new Model 850 Automatic Bundler. This machine bundles groups of packages . . . 4, 6, 8, 12 and 24 to a bundle . . . at speeds up to 18 per minute. One operator can easily keep pace with a packaging line as high as 180 per minute. Depending on construction selected, the machine bundles with kraft paper, polyethylene, cellophane and other films; in bundles within 5″ to 12″ long, 4″ to 10″ wide and 1″ to 8″ high. Used for textiles, paper items, drugs, chemicals, cosmetics, food products . . . and/or what have you? **Battle Creek *"Continuous Flow"* Packaging Machines, Inc., Battle Creek, Michigan.**



CHANGE PACKAGE SIZES WITHOUT EXCESSIVE DOWNTIME! Handwheel controls for varying the pouch width, and a simple gear change for varying pouch length, — both made without disturbing the heat-sealing units — provide almost instant adjustability. Thin articles (not necessarily uniform in shape) are pouch packaged between two endless strips of heat-sealing packaging materials at speeds up to 80 per minute. Pouch sizes range from a minimum of 2″ x 2″ x 1/16″ to 27″ x 15″ x 1½″ maximum. The "Flexopaker" is especially applicable for articles in the textile, food, automotive parts, industrial products, hardware or similar industries. High speed "Continuous Flow" performance but with a low price tag. **Battle Creek *"Continuous Flow"* Packaging Machines, Inc., Battle Creek, Michigan.**



BATTLE CREEK'S NEW 51-CR WRAPS UP TO 130 FRACTIONAL PACKAGES PER MINUTE! A new high speed wrapping machine has been perfected to produce from 90 to 130 fractional packages per minute. Handles Cellophane (with or without polymer coatings); waxed glassine; or laminated foils. Converts quickly to the usual fractional package sizes, viz: square sodas, rectangular grahams, or rectangular sprayed crackers; in flat stacks. Can be equipped with pin type loaders. Forms a tightly contoured, snug overwrap that assures freshness and flavor retention. In spite of the high speed, the crackers are handled gently through all feeding and wrapping operations. **Battle Creek *"Continuous Flow"* Packaging Machines, Inc., Battle Creek, Michigan.**

For more information circle No. 227 on Reader Service Card, Page 97

Circle No. 228 on Card, Page 97

another Olin Mathieson packaging product!

CORRUGATED CONTAINERS

Fragile . . . package with Skid-Master

You get extra protection at no extra cost by ordering Skid-Master containers with built-in nonskid surfaces. Skid-Master nonskid kraft provides the working traction that controls container slippage and sliding in transit and in warehousing . . . a major cause of product damage. And, you get this extra protection without sacrificing package appearance or strength. Skid-Master containers print, seal, and handle like regular, untreated kraft. Contact Olin Mathieson today: Packaging Division, West Monroe, Louisiana.

OLIN MATHIESON • PACKAGING DIVISION

THESE FIRMS

Do Better with Doughboy LABELERS

Mrs. Smith's Pretzel Co.
Easton, Pa.

J. P. Fritz Wholesale Co.
Newport, Minnesota

Bradley Candy Co.
Nashville, Tenn.

Dayton Nut Products Co.
Cincinnati, Ohio

Big-Tex Distributing Co.
Dallas, Texas

Fresno Macaroni Co.
Fresno, California

Burry Biscuit Co.
Elizabeth, New Jersey

General Candy Co.
Chicago 39, Illinois

Welch Nut & Candy Co.
Chicago, Illinois

Anderson Candies, Inc.
Wilmington, N. C.

King's Bakery, Inc.
Colledgedale, Tenn.

Seyfert Foods Co., Inc.
Fort Wayne, Indiana

C & C Distributors
Sharon, Pa.

Kimbell Candy Co.
Chicago, Illinois

Dorothy Flicek Industries
Chicago, Illinois

Boston Sausage & Provision Co.
Boston, Mass.

D. F. Stauffer Biscuit Co.
York, Pa.

Reed & Prince Mfg. Co.
Worcester, Mass.

Wells Mfg. Co.
New Vienna, Ohio

More Candy Co.
Rochester, N. Y.

Mrs. Slaby's Noodle Co.
Berwyn, Ill.

Ohio Art Co.
Bryan, Ohio

School House Candy Co.
Providence, Rhode Island

The Fleming Co., Inc.
Topeka, Kansas

Peanut Products Co.
Indianapolis, Ind. and Des Moines, Iowa

Walter Johnson Cookie Co.
Tulsa, Oklahoma

Flavour Candy Co.
Chicago, Illinois

Mason Candy Co.
Trinidad, Colorado

Barnard Nut Co.
Miami, Florida

H. H. Evon Co.
Chicago, Illinois

Mamma's Cookies Bakeries
Cicero, Illinois

Whites Food Products Co.
Oakland, California

Pack twice as fast with

Doughboy

JAW SEALER-LABELERS

MODEL PJS

The new Doughboy Jaw Sealer-Labeler will do the work of two and sometimes three ordinary labeling machines. As soon as the bag touches the vacuum (air) control, the machine takes over and leaves operator's hands free to reach for the next bag. It automatically labels, seals, and if desired, codes and punches the package. The automatic cycle cuts operator motions, increases production speed and assures better packaging. Pneumatic pick-up assures *positive* single label delivery from label box to sealing jaws. Label clamp holding bar assures *positive* positioning of label at sealing jaw. Adjustable folding bar assures *positive* label folding.

CODER AND HOLE PUNCH OPTIONAL

Coder and Hole punch are optional. An embossed code is precision made from metal type which is easily placed in accessible holder at the front of the sealing jaw. The punch, made of high carbon steel, punches a clean edged, round hole exactly centered in label.

Doughboy **INDUSTRIES, INC.**
MECHANICAL DIVISION
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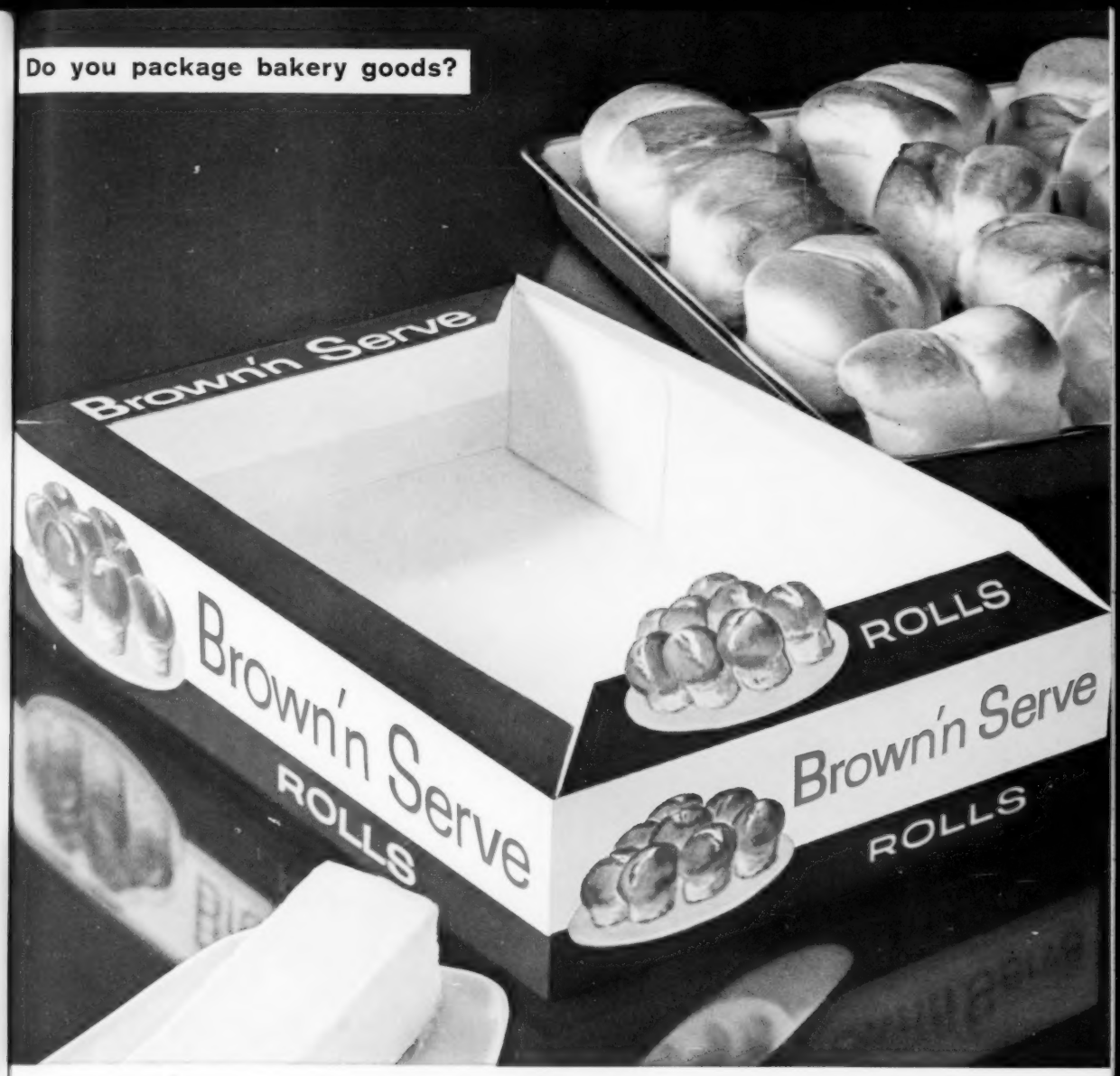

New grease-resistant **KREOCOAT** by International Paper is 5 ways better than laminated bleached board

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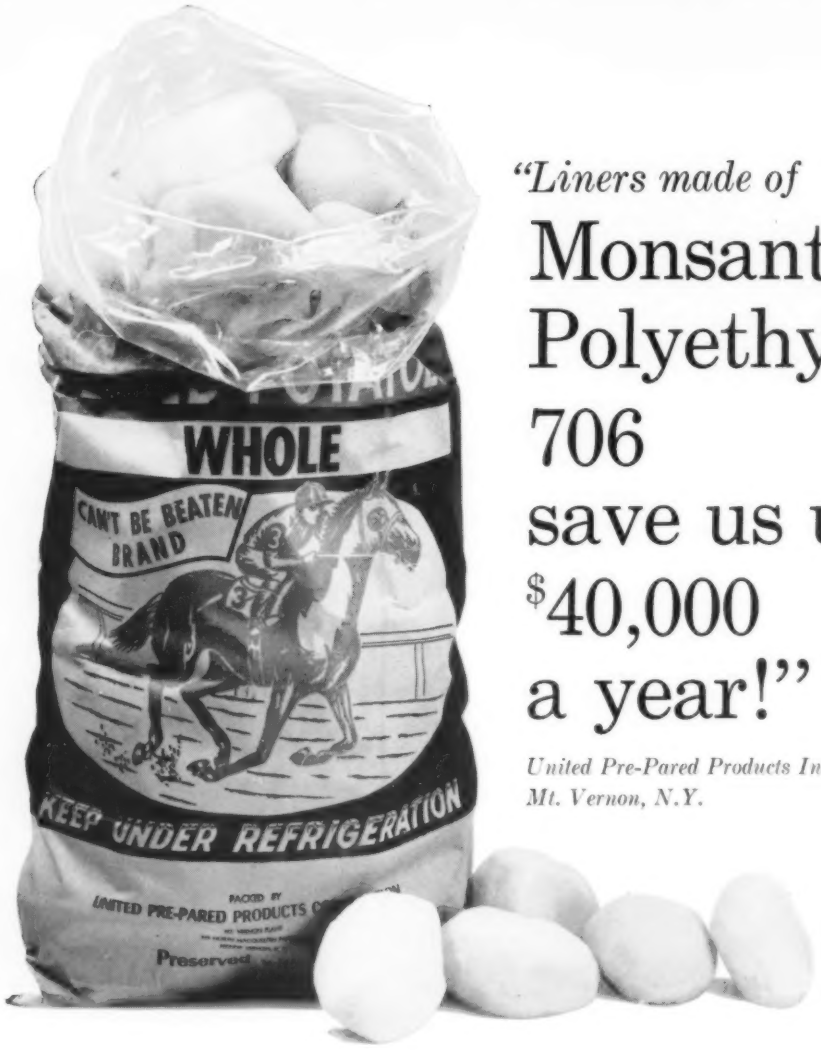
Fine Paper & Bleached Board Division **INTERNATIONAL PAPER** New York 17, N. Y.



"Liners made of

Monsanto Polyethylene 706 save us up to $40,000 a year!"

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United Pre-Pared Products ships about a million bags of peeled or french-sliced potatoes to institutions each year. They must reach the customer in perfect condition. No pressure bruises or splits—especially no soiling.

Only polyethylene film with its moisture vapor impermeability and tensile strength can do this over-all job. And United discovered this to their reward and satisfaction.

"For years, we used liners made of another material, and we often encountered difficulty in getting positive protective closures. Occasionally these liners, under great stress, would split and were sometimes difficult to separate since the sides stuck together. The result: delays and pile-ups on our production line. After switching to polyethylene liners made of Monsanto Polyethylene 706, these difficulties were eliminated. As a matter of fact, exclusive use of Monsanto polyethylene liners has cut liner costs *in half*, reduced breakage in transit by at least 30%. Liner savings alone amount to as much as $40,000 a year!"

Guarantee dependable packaging service bag after bag, liner after liner. Order polyethylene packaging film based on "Tough 706," the Monsanto resin specifically developed for industrial packaging. For names of converters or suppliers, write to Monsanto Chemical Company, Plastics Division, Room 1005, Springfield 2, Mass.

Monsanto

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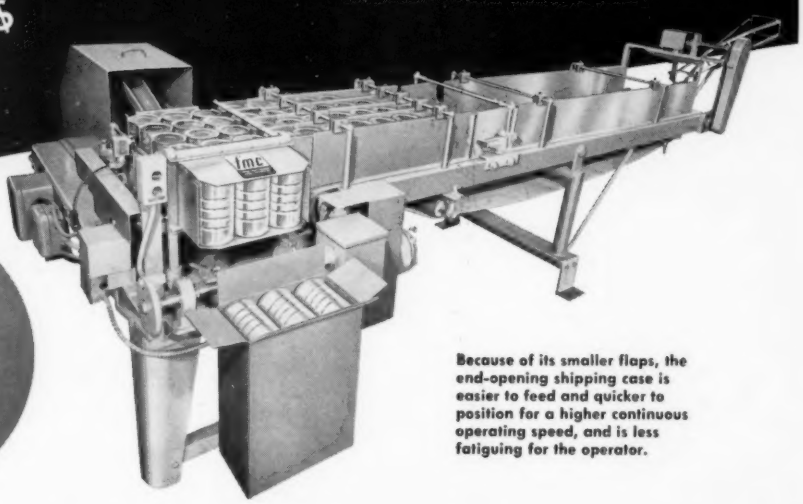
Save WITH THIS COST CUTTING CAN CASER



Because of its smaller flaps, the end-opening shipping case is easier to feed and quicker to position for a higher continuous operating speed, and is less fatiguing for the operator.

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FOR SINGLE TIER LOADING

46 OZ. AND NO. 10 CANS

AND OTHER CAN SIZES

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In reviewing techniques and equipment contributing to peak efficiency in powder filling and packaging, Mr. Schokmiller stresses correct use of air in powder conveying and transfer, proper dust removal and collection, machinery tailored to the cans it handles, and having the right packaging room layout and facilities. He and his associates have made effective use of all these. Operating a powder line at 120 cans/min., using a 5-girl crew, they have held their total powder loss (including that of spilled cans) to a mere 0.52 per cent.

Running a powder filling line with trifling powder loss

By Charles F. Schokmiller,
Assistant Vice President — Manufacturing, Grove Laboratories Incorporated, St. Louis

NINE STEPS TO EFFICIENT POWDER FILLING:

1. Right amounts of positive air pressure to convey product through fully closed system.

2. Dust removal equipment using volumes and velocities matching exact needs at particular points.

3. An adequate head of powder above filler hopper, contributing to a uniform level in hopper.

4. Venting of filler (1) to avoid bridging, and (2) to furnish even flow without trapping of air in powder.

5. Static pressure in packaging room to reduce air current and prevent blowing of powder around room.

6. Filler auger precisely matched to requirements of particular powder being filled.

7. Close fit of can bodies and top assemblies to assure trouble-free closing at production speeds.

8. Machine parts that precisely match can dimensions handled with them on sorting and capping units.

9. Standard methods of training packaging line crews to assure their interchangeability and uniformity of work.

Development of efficient powder filling demands close attention to a chain of factors. Disregard any one of these links, and you break the chain, thus cutting down your efficiency. Heed all of them and coordinate their requirements, and you will get good results. This has been our experience in installing and refining our manufacturing and packaging of Ammen's medicated powders, which we put in 2½- and 5½-oz. oblong metal cans "in production" and in 1-oz. cans for sampling.

Proof that our efforts paid off is our extremely low loss of powder: Just 0.52 per cent loss from all causes, including spills on the line, damaged packaging, and losses in course of filling. Further, we get this result on a production line basis. We originally planned our line to run 72 cans/min. and already have it running 120/min.

Production Of Powder

A look at our processing and conveying will help you understand our filling and packaging. **A major point in effective powder**

Charles F. Schokmiller was a graduate of Washington University in mechanical engineering. Prior to joining Grove Laboratories, he devoted seven years to type foundry and utilities fields in machine design and development, and he spent four years as a sales engineer in the mill industry. At Grove he worked in maintenance engineering, was production manager, plant manager and manager of manufacturing before becoming assistant vice president. Mr. Schokmiller was a registered professional engineer in Missouri, and a member of Packaging Institute and the Engineers' Club of St. Louis.

filling is having an adequate head of powder in the hopper. Much planning and effort has gone into getting this proper head! From the point where ingredients go into mixing equipment until powder drops into open cans at the filler, we operate a closed system—no exposure to open atmosphere.

Total area requirement for all of our processing and packaging is 1600 sq. ft. Bulk material and weighing are isolated from the packaging area. Processing crew members weigh ingredients and dump them into a Ro-Ball Airmatic unit. From here the material is conveyed through a stainless steel Pneumatic conveying system to a J. H. Day ribbon blender with a 63-cu. ft. bin. Conveying system consists of 2-in. tubing with sanitary fittings, combination feeder and aerating valves.

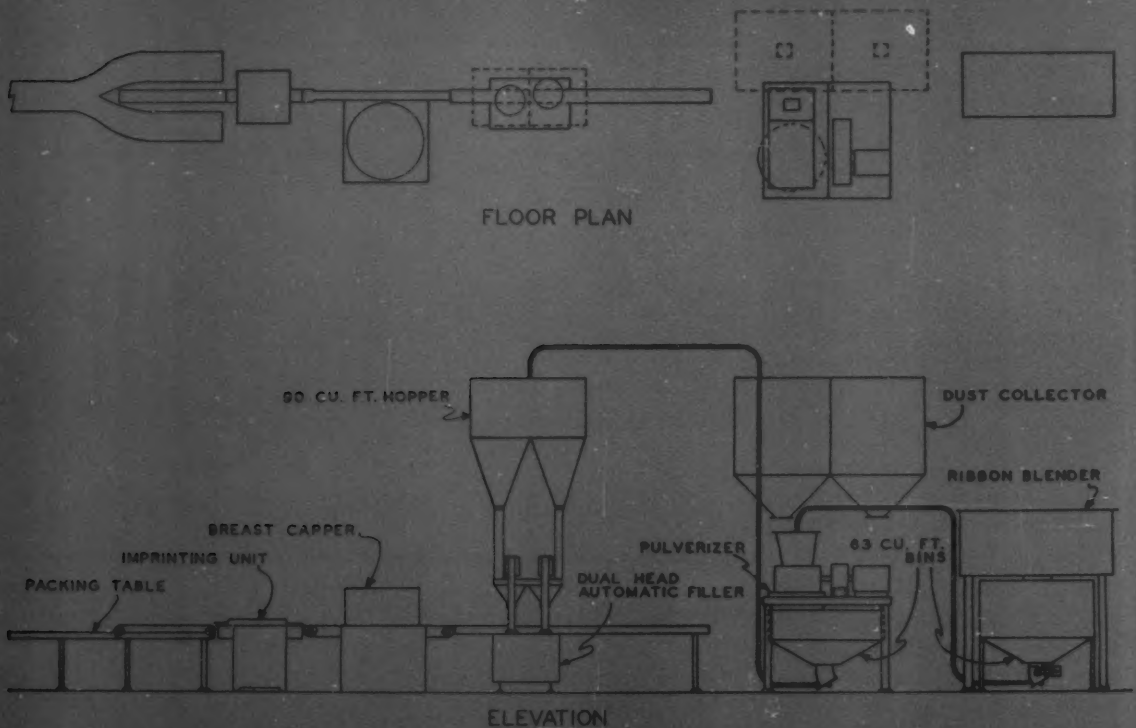
Thus, ingredients are weighed, milled, and sieved (this removes extraneous particles) prior to adding the active ingredients at the point of blending. Next, our material goes through the Pneumatic conveying system to a Metals Disintegrating Micro pulverizer which has a 63-cu. ft. bin. From here the powder passes to a 90-cu. ft. hopper which feeds the twin hoppers (directly below it) of our dual-head Mateer automatic filler. **Air vibrators are used on all hoppers to insure continuous flow of powder.**

So long, Schok

With deep regret, we record the untimely passing of Charles F. Schokmiller. His sudden death following a heart attack, July 28, presents a great loss, not merely to his family, friends and company, but also to the packaging organizations and to the packaging field generally—to which he made so many contributions. A few days before his passing he put the finishing touches on this article.—R.B.H.

Control Of Flow

The hopper and transfer equipment is a dual-purpose system and can operate automatically or with individual manual control for each component part. To prevent mixing from one lot to another of the product we have gate locking so that one closes before another opens. At several points in the conveyor tubing we have installed short sections of Tygon transparent tubing for observation of powder flow.



CLOSE POSITIONING OF MACHINERY characterizes Grove's new powder line. Product moves (right to left) through blending and pulverizing, then to filling. Table (right of filler) holds empty can bodies. Filled cans in cases go out through wall opening (far left) to case sealing and transfer.

To meet the primary filling requirement with sufficient head of powder above the filling point we had to work out a uniform flow without bridging. Since our system is totally enclosed this meant proper use and control of air to do the conveying.

Incidentally, in addition to the entire conveying and material handling being a closed system certain explosion-proofing was incorporated in accordance with insurance requirements and common knowledge of hazards of dust handling. All wiring and electrical equipment in the area meets building code requirements for explosion-proof installation. Air vibrators are used for same reason.

Using Air Pressure

To convey the powder we use air at 6 lb./sq. in. **Although this pressure is uniform, we get different velocities and volumes through choice of openings at various application points.** For example, our system picks up the powder with low velocity air, and drops it to the filler by high velocity air.

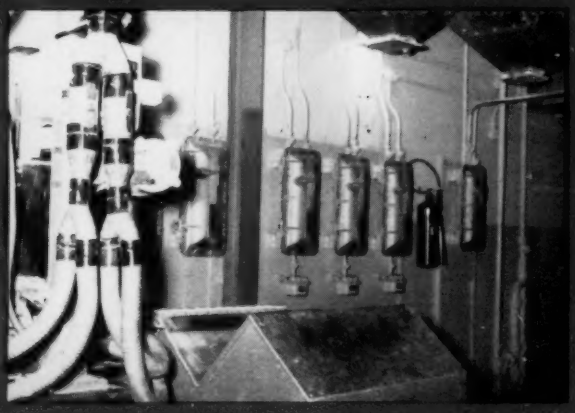
In addition to maintaining proper head of powder in the filler hoppers, provision was made for removal of air from the powder. In our system the air brings the powder to the large hopper which supplies the hoppers on the filler. The air is removed upon entering large supply hopper permitting the powder to drop. Although there is some aeration, for all practical purposes there is no air in the product by the time it reaches the filling auger.

Air vents were placed in the filler hoppers for final release of any entrapped air. Adequate venting helps avoid bridging of the powder and contributes to accurate control of volume and weights.

How To Collect Dust

A vital adjunct of a good powder filling operation is a dust removal and collecting system. We have a dry type American Filter system with a capacity of 3,500 cu. ft./min. It is designed to maintain proper velocities. Accurate control of volume and velocity of air used to pick up dust is a major factor in having an effective powder filling operation. In contrast to the positive pressure system of our conveying set-up, our dust removal equipment is a suction system, using a 10 h.p. motor.

We have dust pickups at various points, wherever necessary to remove powder or control its movement, such as at all supply hoppers and machinery. Further, this includes points outside the closed system, such as at the filling and breasting equipment. Any dust removal system has to be tailored to the particular product being handled, so that velocities and volumes of air are determined by the characteristic of the product.



INTRICACY OF DUST REMOVAL system stresses its importance in holding down loss of powder during filling. Suction system (with 10 h.p. motor) uses dust pickups along line to remove powder or control its movement.

AT START OF LINE girl at left puts empty can bodies on conveyor leading to filler. Angled rack holds corrugated boxes containing cans. Packaging room uses positive pressure to reduce air current, cut powder blowing.

Static Pressure In Room

If you are planning such an operation as ours you must also consider the correct atmosphere in the packaging room. Our entire area occupies 1,600 sq. ft., 528 sq. ft. of which are separated from the packaging area. Our dust collecting system picks up from equipment in weighing area 3,500 cu. ft./min.

(*Turn page*)

ACCURATE FILLS WITHOUT DRIPPING of powder depend on proper augers. Fill is "on the button." Vibration of filling table shakes down powder during fill. Dust removal system takes out any powder escaping during fill.

AIR-OPERATED VIBRATOR delivers top assemblies (breast plus neck and cap) to equipment which spots and presses them on filled can bodies. Units of packaging line are positioned as closely together as possible.

This air is filtered and returned to the packaging area.

Some 1,700 cu. ft./min. of this quantity are picked up from the weighing area and this amount, plus 4,000 cu. ft./min. of fresh air supplied by another fan, makes a total of 5,700 cu. ft./min. input into the packaging area. The exhaust fan removes 5,000 cu. ft./min. **Thus we have a static pressure in the packaging area which cuts down air current and minimizes blowing of powder around the room.**

Our Mateer filler fills two cans at a time, one under each of the tandem heads. **Accurate filling, accurate weight and freedom from dripping are dependent upon having proper augers.** These were developed by working with the filler manufacturer before delivery.

Fill "On The Button"

Obviously, we cannot underfill and overfilling is an expensive giveaway of product. Therefore, we try to hit the correct fill "on the button" and provide only a "safety" reserve or slight overfill. Because of the accuracy of our equipment in maintaining weights, it is not necessary to have a wide margin of extra product as an overfill.

To facilitate shaking down of powder into each can we use a standard machine feature—vibration of the filling table. This speeds settling of powder in the container. The dust removal system takes away any escaping powder.

Container Details

Each of our three sizes of oblong metal cans consists of a body and top. The top consists of the breast, neck and captive cap—secured together. Our production line requirements dictate that our supplier maintain close tolerance between body and top assembly. If the breasts fit too loosely, the fit will not be secure; if too tightly the body will be bulged inward when the capping chuck presses the can breast onto the body.

Our experience is that cans and tops must fit within close tolerance. This "go" or "no go" situation emphasizes the close control required by the can maker. Top assemblies (breast, plus neck and cap) go into the hopper of a Consolidated sorting unit. This unit is equipped with an air-operated vibrator and regiments the tops on a rotating disc table and delivers them, right side up, into a chute which feeds the Consolidated breasting machine.

The tops move down the chute to a pick-up plate from which the chucks pick them up and spot them on the cans and press the tops into place on their respective cans.

As can breasts are oblong they cannot be screwed or spun into place (such as screw caps for bottles) so they must be pressed straight down. Aside from close control of can parts, it is also necessary that breasting equipment (even though standard) be built to the particular tolerances for the containers to be handled.

Packaging Line

The individual units in the packaging line are positioned as closely together as possible with enough

space left between the filler and breasting equipment for a check weighing station with a Toledo under and over scale. To facilitate movement of cans from unit to unit Teflon belting is used on the filter and Teflon dead plates were needed on conveyor chain.

Marking And Packing

After tops are applied to the filled cans the containers move from the chain conveyor through a Cozzone unit, which imprints a code number on the bottom of each can. From the discharge conveyor of this unit the girls packing cans pick them off and insert them in a folding carton shelf pack, after which the shelf packs are placed in corrugated shippers. The shippers are then put onto an outgoing conveyor leading through the wall in the packaging area to automatic case sealing equipment elsewhere in the plant.

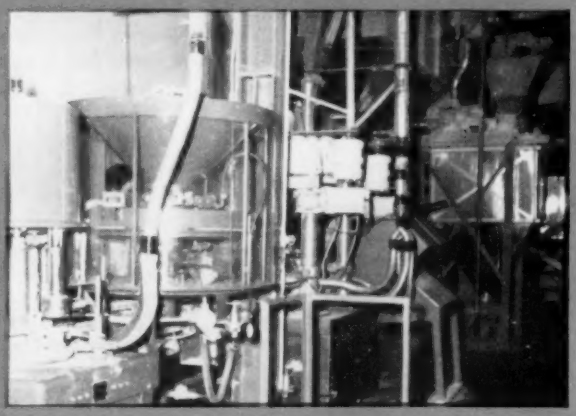
Our 2½-oz. cans are packed 12 into corrugated shelf cartons and 3 shelf cartons into a shipper. The 5½-oz. cans are packed 6 in a shelf container and 4 shelf containers to each shipper. The 1-oz. cans are handled differently. Since they are used for sampling they are packed in bulk containers that are relatively large capacity corrugated boxes.

How Crew Members Work

There are five girls assigned to this packaging line. **No. 1** takes empty can bodies from corrugated boxes (conveniently positioned within her reach, on an angled rack) and puts them on the conveyor leading to the filler. **No. 2** attends the filler and does random or intermittent check weighing of filled cans. **No. 3** looks after the breasting and can coding equipment. **Nos. 4 and 5** (working across from each other) pack cartons and cases, using racks and carton-holding frames mounted at convenient angles. These girls rotate around the line in the course of a day, moving from job to job after each break.

Following the normal practice of our plant, we have trainers who do all the training of girls who work on our packaging lines. We find that having these trainers or leaders means that girls get uniform instruction without the varying emphasis or omissions encountered when one girl instructs her successor. Also, doing it this way enhances the flexibility of their work, and qualifies them to move around our plant from job to job.

When this powder line was first installed, the trainers themselves operated it, thus learning its fine points. Next, they demonstrated the best methods of doing each job. After this, they instructed the others—who now operate the line.



POINTS OUTSIDE CLOSED SYSTEM, e.g., at breasting equipment (left), have dust pickups. Dust removal and collecting is vital to effective filling. Dry-type system has 35,000 cu. ft./min. capacity, keeps proper velocities.

COMPLETED CANS GO THROUGH imprinting unit, then discharge to table where girls pack them in folding cartons, then in corrugated shippers. Skilled trainers mastered line jobs, then taught techniques to crew members.

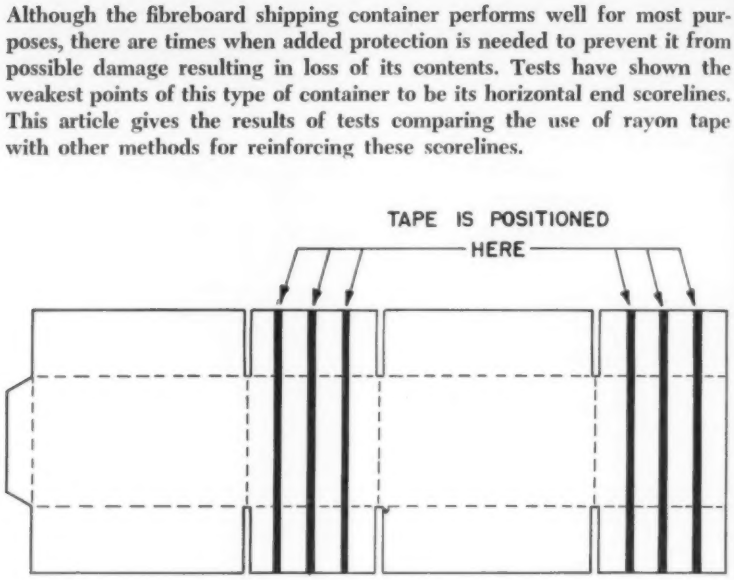
Changing Over

Changeover from 2½- to 5½-oz. cans is very simple because these cans have the same dimensions except height. Therefore, all that is necessary is to raise the height at filling and breasting points. But when changing to 1-oz. cans, the other dimensions also must be changed. **Wherever possible it is advisable to have just one variable for different capacities of cans, i.e. the height.** *(End)*

Tape reinforces container scorelines, conserves fibreboard

By Anderson Miller, Technologist, and Matthew A. Venetos, General Engineer, Container Division, Quartermaster Food and Container Institute, Chicago

Although the fibreboard shipping container performs well for most purposes, there are times when added protection is needed to prevent it from possible damage resulting in loss of its contents. Tests have shown the weakest points of this type of container to be its horizontal end scorelines. This article gives the results of tests comparing the use of rayon tape with other methods for reinforcing these scorelines.



TAPE CROSSES END SCORELINES at contact points of can chimes in shipper for No. 2½ cans; reinforces case, eliminates need of sleeve.

Since its origin, the fibreboard container has gained widespread recognition as an exterior shipping container. Both industry and the government have taken advantage of its usefulness in reducing the cost and complex method of packaging goods for shipment to various points. The fibreboard used has been fabricated in various grades and types—corrugated, solid.

For most purposes, fibreboard containers have performed quite well. However, a great deal of thought has been given to improving containers used for shipment to distant points in the United States and overseas *(2)*.

The world-wide supply lines of the military services expose a shipping container to extremes of climatic conditions, storage, and rough handling as well as to every conceivable mode of transportation. Under these conditions, the exterior shipping container may suffer severe damage resulting in the loss of its contents. **Both laboratory and field tests have shown that the weakest points of a fibreboard container lie on the horizontal end scorelines** *(3, 4)*.

Anderson Miller is a graduate of Tougaloo College with a B.A. degree. Following his military service, he studied physics and chemistry at the University of Chicago and was precision inspector of the quality control department of Ford Motor Company's aircraft engine division. He has been with the Institute since 1955.

Matthew A. Venetos is a graduate of Northwestern University with a B. S. degree in chemical engineering. He joined the Institute following his graduation. Having attended the university under a cooperative program for engineering students that alternates practical experience and academic work, Mr. Venetos was with the basic research section of the Portland Cement Association and the paint formulating laboratory of the Du Pont Company in Chicago – during alternate quarters.

Preliminary Tests

In a previous overseas field test, steps were taken to reinforce the horizontal end scorelines as well as the horizontal side scorelines. **One method of reinforcing the container scorelines involved the use of steel wire or flat metal bands** placed two lengthwise (dividing the width of the container in thirds) and one girthwise around the center of the length. (See Fig. 1.)

This method of reinforcing the scorelines performed satisfactorily for shipping light- and medium-weight canned goods. For heavier canned goods, such as meat and fruits, the containers began to fail at the horizontal end scorelines before reaching their destination. (See Fig. 2.)

Another method of scoreline reinforcement involved the use of fibreboard sleeves. In effect, these sleeves protect the horizontal scorelines by covering them with an additional layer of fibreboard. (See Fig. 3.)

The shipments involved cans of different sizes and weights. The routes used for the shipments caused the containers to be exposed to various types of climatic conditions and practically all other conditions that would be encountered in a regular supply line shipment. Inspection of the physical condition of the containers was made at various points along the line as the shipments progressed.

Upon reaching the final destination, the containers were examined for damage, and it was found that sleeved containers were the most effective in reducing container failures. **Fibreboard sleeves were about three times as effective as metal bands for protecting fibreboard containers against damage.**

However, the main disadvantage of the fibreboard sleeve is that it requires approximately 30 per cent as much fibreboard as the container itself. This makes the sleeve rather expensive, and also results in an increase in the gross weight and volume of the packs. **Another disadvantage** is the extra labor required to put the sleeve over the container. Application of the sleeve is a hand operation. All of these conditions cost the government thousands of dollars per year.

Consider Tape

Fibreboard containers packed with canned goods are specially vulnerable to damage because the can chimes make point contacts along the scorelines, resulting in high local stresses. It was therefore reasoned that, instead of full-length scoreline reinforcement, as provided by the fibreboard sleeve, all that is really needed is some means of reinforcing the points where the can chimes touch the scorelines.

Recently, the Container Division* considered the use of tape for this purpose. By use of tape across the horizontal end scorelines, at the point of contact of the can chimes, it was felt that the sleeve could very possibly be eliminated. (See Fig. 4.) Also, using this method, the gross weight of the container would not be increased to any extent, and conservation of fibreboard would be achieved.

PROCEDURE

Materials

Various types of tape were tested for this purpose, and selection of the most suitable one was made on the basis of tensile strength, cost, ease of application, and performance. **The tape** selected was a special rayon type, manufactured by Chicago Printed String Co., 0.5 in. wide, and 0.010 in. thick, with a tensile strength of 250 lb.

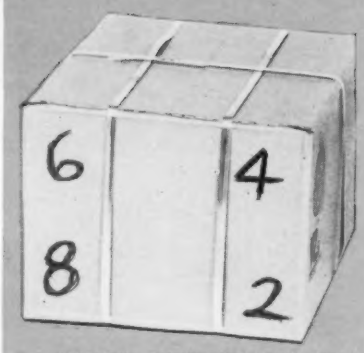
The containers used in the tests were fabricated from V2s solid fibreboard (water- and moisture-resistant board for shipping products overseas) for No. 2½-size cans.

Use Three Methods Of Reinforcement

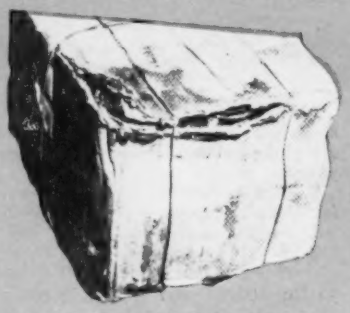
A comparison was made of three methods of scoreline reinforcement:

1. Regular slotted containers with two lengthwise and one girthwise flat metal strap (0.015 x ⅜ in.). *(Turn page)*

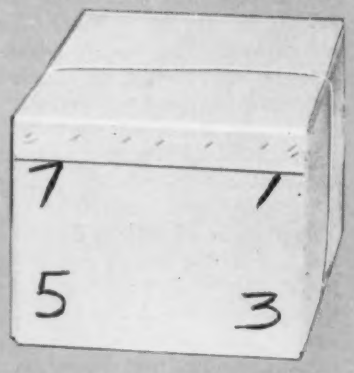
*Container Division, Quartermaster Food and Container Institute, Chicago.



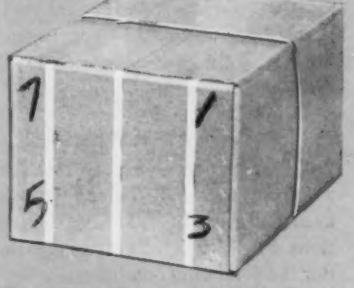
1 SCORELINES REINFORCED WITH METAL BANDS resulted in satisfactory container for light- and medium-weight canned goods.



2 HORIZONTAL END SCORELINES (reinforced with metal bands or wire) failed before case, with heavy goods, reached destination.



3 SLEEVES PROTECT HORIZONTAL SCORELINES, were effective in reducing container failure, but are expensive, increase weight.



4 RAYON TAPE, across horizontal end scorelines at point of contact of can chimes, reinforces scorelines, keeps gross weight down.

TABLE I

Average Number Of Drops To Failure After Storage Under The Following Conditions

Type of Packs	73° F., 50% R.H.			100° F., 90% R.H.			Water Spray			Overall
NO. 2½ CONTAINERS WITH:	average	high	low	average	high	low	average	high	low	Average
Two straps lengthwise and one girthwise	18	23	15	26	28	23	14	16	11	19
Sleeve and one girthwise strap (center)	37	43	34	45	51	40	22	27	19	34
Sleeve and one girthwise and one lengthwise strap (center)	26	32	16	48	56	41	34	46	17	36
Tape and one girthwise strap center	31	43	27	29	36	23	18	26	13	26
Tape and two girthwise straps approximately 4½ in. from each end	35			33	40	28	18	19	15	29

Note: R.H. = relative humidity
Water spray intensity = 4 in./hr.

2. Regular slotted containers with fibreboard sleeve and one lengthwise and one girthwise strap (some with only one girthwise strap).

3. Regular slotted containers reinforced with tape, and one and two girthwise metal straps (two groups).

The tape was applied by hand to the scored and slotted container blanks. A rapid-drying, water-resistant adhesive was used. Initially, the tape was applied to the inner surfaces of the container. This was done in order to take advantage of the protection afforded against abrasion and weathering.

However, in preliminary testing, it was noted that the tape was not breaking, but instead, was tearing loose from the fibreboard surface. Therefore, it was decided to put the tape on the outside surface of the container. The outer flaps of the container would then be glued against the portions of the tape running across the inner flaps, thereby providing additional holding surface for the tape.

Twenty-four cans filled with water to approximately ¾ in. from the top, and sealed, constituted the unit load of approximately 48 lb.

Make Drop Tests

All containers were subjected to a 30-in., cornerwise drop test in accordance with Federal Specifications PPP-B-696, after storage under the following conditions:

1. Storage at standard conditions (73°F., 50 per cent relative humidity).

2. Storage at 100°F., 90 per cent relative humidity for 10 days.

3. Storage for 5 hr. under water spray (simulating rainfall having an intensity of approximately 4 in./hr.).

Conduct Puncture Tests

Further tests were conducted on scoreline reinforcement which involved the use of the General Electric puncture tester. The samples were tested in accordance with ASTM methods (5).

Samples for testing were scored to simulate container scorelines. Some of these were reinforced with tape, some with simulated sleeves, and others had no reinforcement. The punctures were made through the scoreline, scoreline and simulated reinforcing sleeve, and scoreline with tape reinforcement.

RESULTS

The results of the performance of the containers are shown in Table I, where it is noted that the containers reinforced with tape perform about as well as the containers with sleeves. By the same comparison, they perform approximately 50 per cent better than containers with only the metal straps.

TABLE II

Puncture Of Container Scorelines (in.-oz./in.)

Test	Average Value	High	Low
V2s:			
No reinforcement	534	548	520
Simulated sleeve	1230	1270	1200
Tape reinforced	1223	1260	1150
200-lb. TEST:			
No reinforcement	185	....	....
Tape reinforced	1040	....	....

Scorelines Fail, Tape Holds

In many of the packs containing tape reinforcement, the end scoreline failed completely, but the tape held fast, thereby preventing any possibility of content spillage. This could mean that the containers had not failed completely, and were capable of further shipment, if necessary.

The results of the puncture tests are shown in Table II. Note that the tape reinforcements make a significant increase in the scoreline strength of 200-lb.-test fibreboard, from 185 to 1040 in.-oz./in.

DISCUSSION

In regard to production application of the tape, the most effective method would probably be that in which the tape is incorporated inside the fibreboard sheet in the lamination process. The tape would be fed between the laminating rollers from spools which could be positioned along the fibreboard sheet, so that the tape is applied at those points where support is needed.

Adequate Replacement For Sleeve

Incorporating the tape between the fibreboard laminations would protect it from abrasion and weathering. However, the greatest advantage would be the increased holding power due to the fact that the adhesion area for the tape would include both sides of the tape instead of one.

In view of these tests and the extensive knowledge gained in previous shipping tests (*1, 3, 4*), it would be a safe assumption that the tape-reinforced containers herein described are an adequate replacement for the tried-and-true, sleeved container for cased canned goods and any items of such a

(Continued on Page 106)

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Customer confidence... key ingredient for repeat sales... requires carefully designed protective packaging that never lets the customer down.

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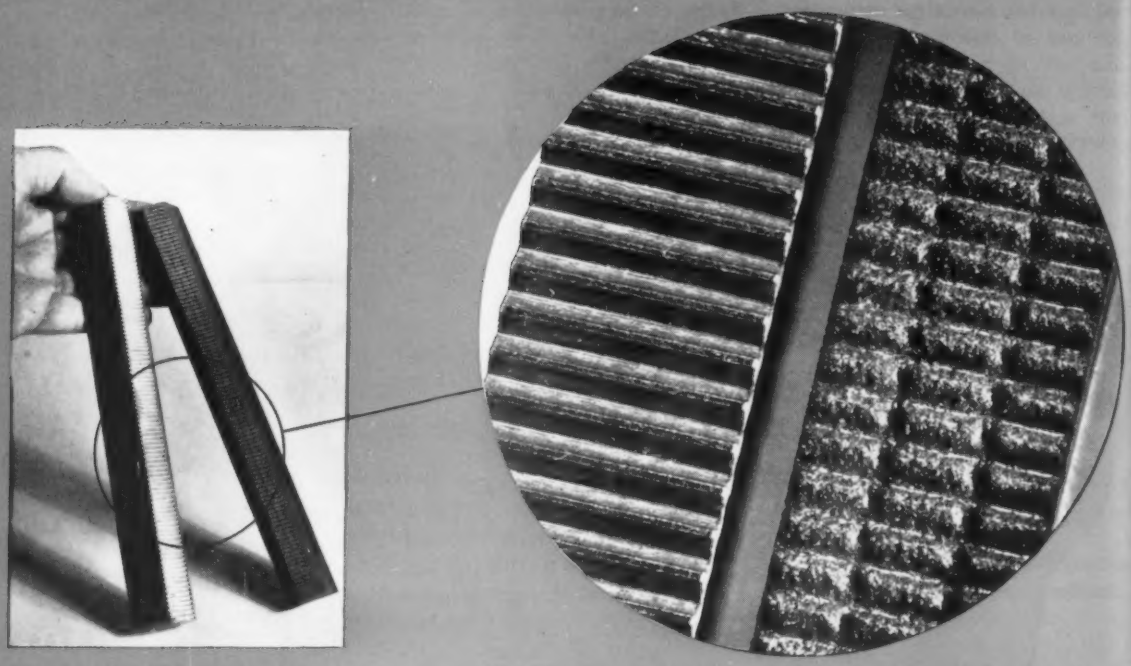
Lever Brothers Company uses Riegel Poly Pouch to vend "All" in self service laundries. Poly Pouch is made, flexographic printed, heat-seal coated by Riegel for Scientific Packaging Company.

For more information circle No. 234 on Reader Service Card, Page 97



1 CONVENTIONAL CRIMP-SEAL JAW (left bar, both photos) of type used in make-and-fill packaging machines, is inexpensively converted to SILICONE-OXIDE-COATED, CROSS-SERRATED (SOCS) JAW (right bar, both photos).

Jaw modification improves film sealing

Cross serrations in conventional crimp-sealing jaws increase seal strength by as much as 15 per cent. Cross serrated seals require up to 45 per cent more energy for peeling than do standard crimp seals.

By Paul G. Stephan and Frank G. Maros,
Film Department, E. I. du Pont de Nemours & Company (Inc.), Wilmington

The polymer-coated cellophanes—which have become one of the familiar materials in packaging in the past 18 months—have presented no serious difficulties on some types of packaging machinery. A shift to the new film from nitrocellulose-coated cellophane has called for minor adjustments in most overwrap applications, and many packagers have made the changeover without too many problems.

Make-and-fill machines and bag-making equipment have been a different story, however. This machinery makes end-seals with metal crimp-surface jaws, and two problems have arisen in this operation: The polymer coating (1) sticks to conventional sealing surfaces, and (2) causes corrosion.

In working with the polymer-coated cellophanes, we have developed a sealing jaw modification which has eliminated these difficulties. In addition it produces seals

that are significantly better in strength and durability.

Consists Of Cross-Serrations And Coating

The modification is accomplished by machining a cross-serration in the jaw surface, and by applying a coating of silicone resin and aluminum oxide. Referred to as SOCS (silicone-oxide, cross-serrated) jaws, the new sealers have given trouble-free performance with polymer-coated film both in the laboratory and in approximately 75 commercial installations to date.

The silicone-oxide coating can be applied to standard steel jaws in a commercial process at a cost of between $7 and $10 a surface. Cost of machining the serrations is nominal. SOCS jaws may also be purchased from some machine manufacturers.

Life of the coating has not yet been defined. Several sets are now in their seventh month of operation and one experimental set is still operating successfully after 13 months.

The aluminum oxide component of the coating serves as a hard matrix for the silicone release agent and protects the underlying steel from corrosion. The cross-serrations, introduced into the design as a means of reducing the area of sticking surfaces, turned out to be a means of increasing seal strength as well.

Polymer Coatings Carbonize

The sticking of polymer coatings to heated sealing surfaces appeared early in K-film's development as one of those problems that every technological advance seems to create. Under the temperature and pressure requirements of normal sealing of this film, the coatings stick to the sealer and carbonize. The carbonized deposit increases coating pull-off and soon becomes a continuous surface covering.

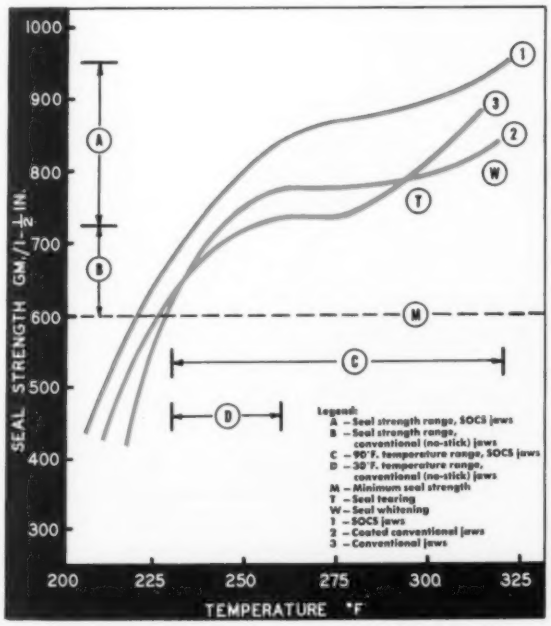
An easy solution for flat sealing surfaces was available in Teflon TFE-fluorocarbon resin, either as a direct coating or as an impregnant in glass cloth. However, when this resin was applied to serrated jaws, the crushing and abrasive action of mating teeth soon wore the coating, and the problem returned as bare metal was exposed. (It is almost universal practice to use crimp seals on make-and-fill machines since they give superior strength, rigidity, and appearance in this application.)

In addition to the sticking phenomenon, chemical changes in the heated film coating release corrosive agents. These act upon the jaws themselves, gradually eroding the surface.

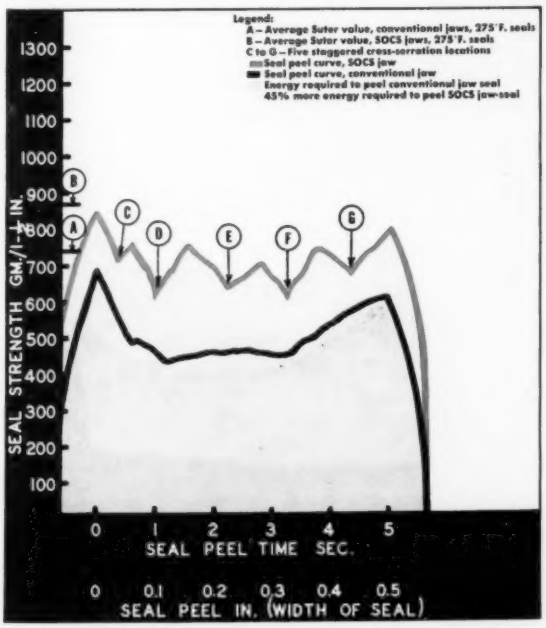
Early attempts at a solution, using rubber backing pads and other coating or jaw materials, sometimes provided good initial results, but were too short-lived for commercial use. Ceramic coatings were found to perform quite well and their surface roughness seemed to be associated with good release properties. After two or three hours' running, however, pores filled up and the polymer coating began to stick once more.

Try Silicone Resin

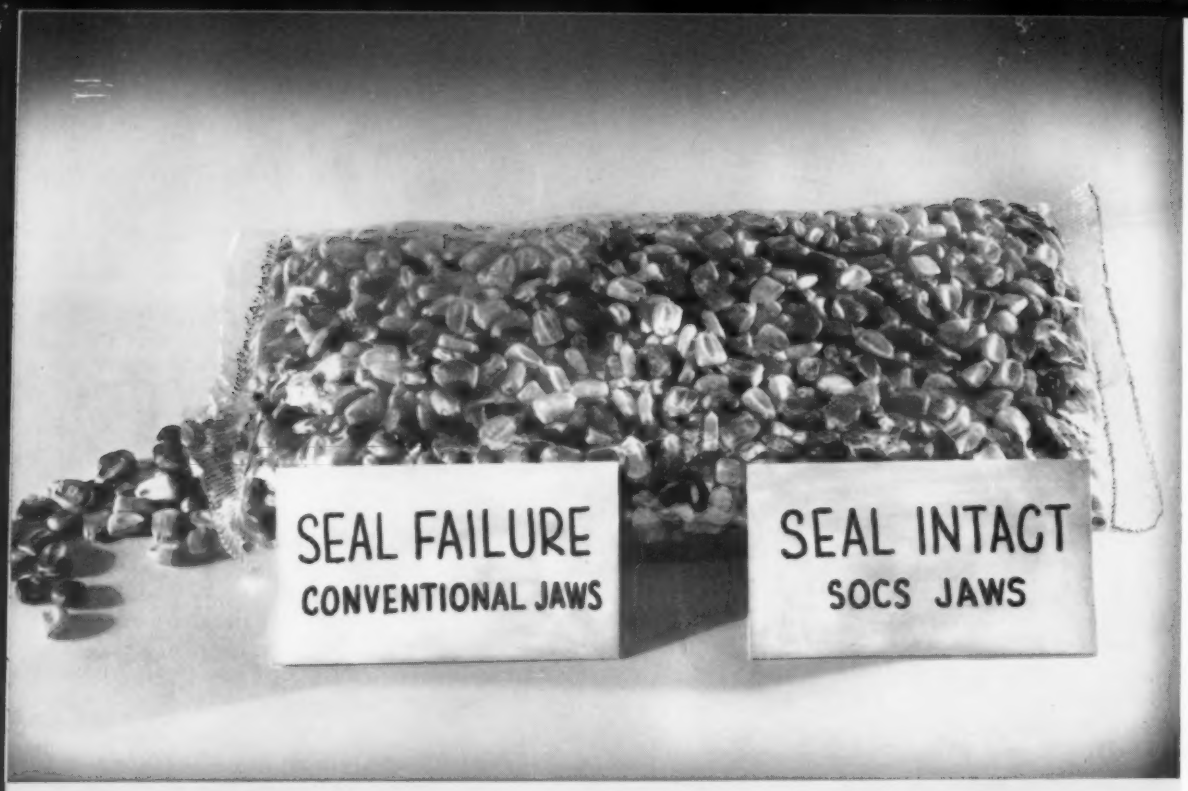
After experimenting unsuccessfully with the introduction of various release materials into the



2 **INCREASED SEAL STRENGTH IS OBTAINED WITH SOCS JAWS**—as much as 15 per cent more—as compared to conventional crimp-sealers. (Single web 300 K-203 cellophane sealed on Hayssen Compak machine.)



3 **MORE ENERGY IS REQUIRED TO PEEL CROSS-SERRATED SEALS**—up to 45 per cent—than is needed for standard crimp seals. (Single web 300 K-203 cellophane, sealed at 275°F. on Hayssen Compak machine.)



4 **DROP TESTING OF PACKAGE** demonstrates increased seal strength of cross-serrated seals over regular crimp seal. Conventional seals failed after 30 4-ft. drops; SOCS seals withstood 45 drops.

ceramic jacket, investigators impregnated the aluminum oxide coating with a thermosetting, semi-permanent silicone resin.

The resulting coating combined release properties equivalent to those of Teflon with the durability of aluminum oxide. Performance with K-cellophane was excellent. Sticking and corrosion were eliminated, and the solution met with commercial acceptance.

Paul G. Stephan was graduated from Purdue University with a B.S. degree in mechanical engineering. In 1950, he joined the engineering service division of Du Pont's engineering department as consultant on mechanical problems in process and machinery. Transferred to the film department in 1958 as mechanical development group manager at the sales development and technical service laboratory, Mr. Stephan now supervises development of mechanical equipment for utilization of the various films.

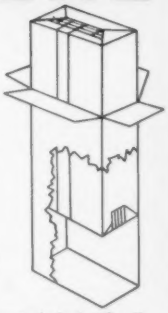
Frank G. Maros received B.S. degrees in mechanical engineering and industrial engineering at the University of Connecticut. Joining Du Pont in 1955 as a methods and standards engineer at the Old Hickory, Tenn. film department plant, he was transferred to the sales development and technical service section of the department in 1957. This year he became technical representative for the New York packaging sales district. Mr. Maros is an associate member of the American Society of Mechanical Engineers.

Cross-Serations Cause "Two-Way Stretch"

The cross-serrations developed in this work are simply longitudinal grooves cut at right angles to the conventional teeth and about two-thirds their depth. (See Fig. 1.) Teeth apexes are the major sticking areas of the jaw surface, and reduction in their area seemed a promising means of reducing sticking.

Likewise, contact-area reduction increases the unit pressure and thereby increases film seal strength. Conventional crimp seals are stronger than flat seals because film surface contact is more intimate when the film is stretched by the mating teeth. By cross-serrating, the film is subjected to a "two-way stretch" which causes still more intimate contact and, in turn, greater seal strength. (*Turn page*)

PNEUMATIC'S NEW FIN-SEAL PACKAGE



- Provides protection of heat-sealed envelope plus rigidity of carton.
- May be filled by weighing or volumetric methods — to any height up to 98% of capacity.
- Inner bag made with face-to-face fusing of currently used thermoplastic coated materials.
- Entire package produced on Pneumatic Double Package Maker combinations.

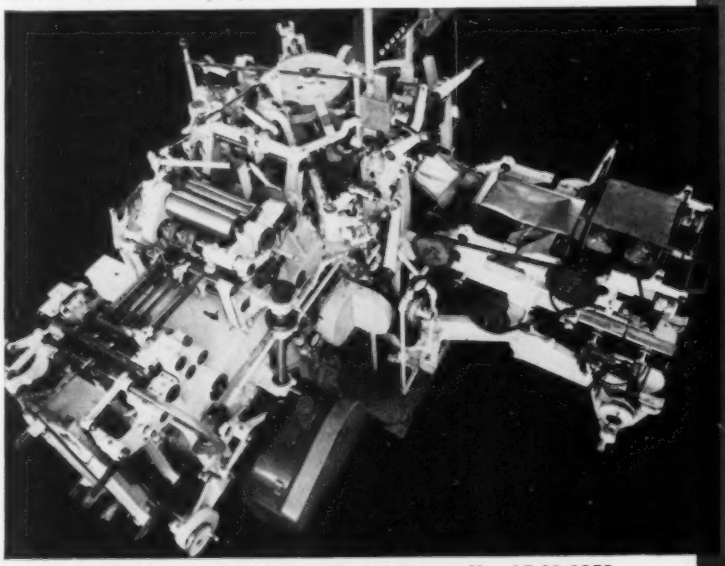
A container which has proved itself highly effective under most demanding conditions, the Fin-Seal package offers moisture protection within full tested range of lining materials.

The symmetrically made inner bag is formed with heat-sealed "fins", centrally located on one side, the bottom, and the top. Top and bottom fins are crimped under pressure with our unique plunger-action device for hermetically sealing folded side seam ends. Vertical or body seal on inner bag is in dead center to allow for mechanical spreading of lining top, during closure operations, without interfering with vertical seal.

This package consisting of a heat sealed protective packet "glove-tight" within a carton provides a means of shelf display and space for printed messages including brand name, recipes, etc. It is ideal for such products as gelatine and pudding desserts, dehydrated soups, dry cereals, pie crust mix, cake mixes and brown or confectionery sugar.

Pneumatic's Fin-Seal Package Maker machine handles all currently available heat seal coated lining materials. If desired, however, the unit may be furnished to run uncoated stocks. With this method a glue pattern is stenciled for side seam, top and bottom "fins" of the inner bag. Operations beyond this point are the same as when thermoplastic coated stock is used.

PNEUMATIC SCALE CORP., LTD., 77 Newport Ave., Quincy 71, Mass. *Also New York; Chicago; Dallas; Rochester; AGENTS: Seattle; San Francisco; Los Angeles; London, England. Canadian Division: Delamere & Williams Company, Ltd., Toronto.*



Visit BOOTH 307, PMMI SHOW, New York Coliseum, Nov. 17-20, 1959

Write for Bulletin No. 137 giving full details on the new Fin-Seal package.

PNEUMATIC

Packaging and Bottling Equipment

Seal Strength Is Greater

The addition of the cross-serrations also changes film peel properties, with the result that seals become 50 per cent more durable to seal peeling loads.

Fig. 2 shows that SOCS jaws produce a seal strength 15 per cent greater than that obtained with conventional crimp-sealing surfaces. Fig. 3 shows that the cross-serrated seals require 45 per cent more energy for peeling than do standard crimp seals.

These theoretical data were corroborated by package testing (see Fig. 4). In package drop tests, seals made with conventional jaws failed after 30 4-ft. drops. Those made with SOCS jaws in bags of identical construction withstood 45 drops. Repeated testing bore out the validity of these findings.

Drawings and complete details covering SOCS jaws are available without charge from the Sales Development and Technical Service Section, Film Department, Du Pont Company, Wilmington 98, Del. Names of companies which apply the coating or supply SOCS jaws can also be furnished.

WITH SOCS JAWS INSTALLED on make-and-fill packaging machine, use of polymer-coated cellophane is practical. Sticking and corrosion are eliminated, stronger seals are obtained.

Aids Sealing Other Films

The increased seal-strength performance of SOCS jaws is not restricted to polymer-coated cellophanes. Similar results are obtained with nitrocellulose-coated films and we are recommending the addition of cross-serrations to any crimp-seal surfaces used with cellophane when seal strength is a problem.

Similarly, the silicone-oxide coated jaws can be used with any film, although they contribute no advantages when nitrocellulose-coated film is being used.

The seal pattern produced by the modified jaws is waffle-like rather than saw-tooth. It is more sparkling than the conventional seal and packagers have generally considered that it adds to package appearance.

SOCS Jaws Require Care

SOCS jaws require reasonable care for maximum life. In addition to normal good operating practices, the following precautions have been found helpful:

1. Be particularly careful to install and align mating surfaces properly.
2. Avoid operating the sealing unit without film.
3. Keep printed film areas out of sealer.
4. Do not use metal tools or wire brushes for cleaning. The brittleness of the aluminum oxide coating dictates this recommendation. Alternatives for cleaning are a bristle brush and wood slivers (for example, tooth picks or wood matches). The former will serve for general cleaning, and the latter for removing any stubborn deposits which may occur. (*End*)

Circle No. 236 on Card, Page 97

The Ludlow Line Protects Your Products Better

This tape's built-in activator saves shippers time, money

Wetting agents *used* to be a problem. They were costly, messy, unreliable and a nuisance to prepare.

Ludlow's Comet Tape has solved this problem with a wetting agent that never fails built right into its trade-mark. As the tape passes over the brush, the Comet trade-mark activates the glue, assuring fast, effective sealing with a minimum of pressure. This exclusive Ludlow feature is available with both Comet Snake Tape* (reinforced) and Comet superstandard kraft gummed tape.

Comet Tape is typical of Ludlow's job-tailored packaging products. Look to Ludlow for greater protection, lower costs and faster packaging. We'll consider it a privilege to serve you.

*Rule 41 — approved for center-strip sealing.

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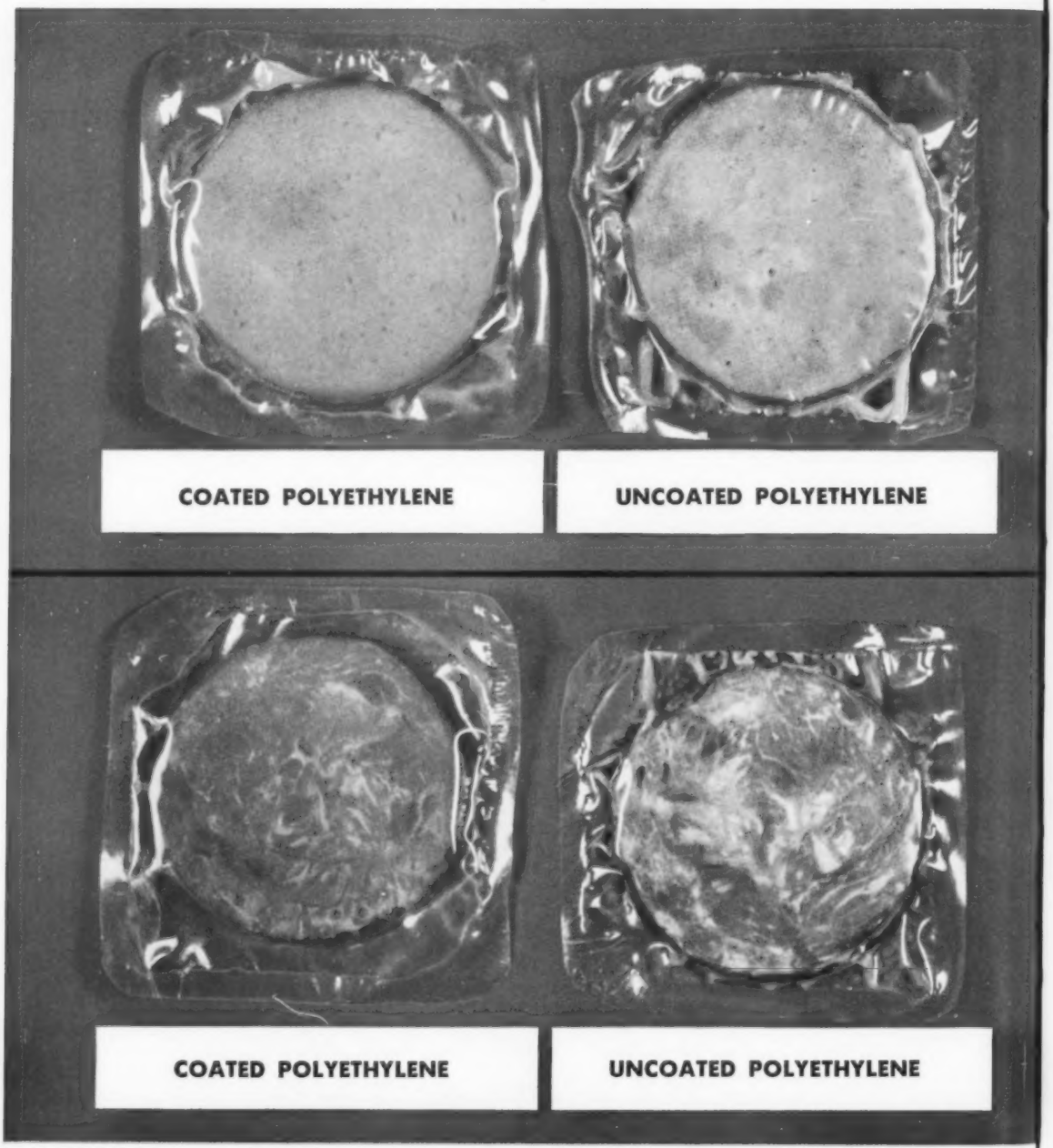

For more information circle No. 237 on Reader Service Card, Page 97

DOW Plastiatrics

DOW'S CLINICAL APPROACH TO HEALTHY PLASTICS APPLICATION

OF POLYETHYLENE-PACKAGED FOODS

Packages of identical Bologna and identical New England sausage, stored in cooler for 30 days. The inner coating of saran resin has prevented mold growth on the meat shown at the left of each set. The meat on the right, packaged in uncoated film, is badly molded.

Pictured on the left-hand page is graphic proof of the degree to which saran resins add to the protective-barrier properties of polyethylene packaging film. Polyethylene's toughness, transparency, workability and low cost make it ideal for the packaging of countless goods and products of all kinds. Its relatively high permeability, however, limits its use as food packaging film. Up to now, that is!

The accompanying photographs show the results of one of the tests made during a Plastiatrics study conducted by Dow Coatings Technical Service Engineers.

By coating polyethylene with a thin inner coating of one of Dow's saran resins, the permeability to gases is greatly reduced. Resistance to grease and oil is increased. And the boost in over-all product protection is reflected in longer shelf-life for packaged foods. The bologna and sausage pictured on the left-hand page are typical of the types of foods which benefit greatly from saran coating protection. Others are similar meats and cold-cuts, cheeses, etc.

Saran resins can easily be applied to film by standard coating equipment. In fact, they *are* being applied at present as a standard coating operation for certain types of products whose ingredients actively attack and penetrate through uncoated polyethylene.

Saran resin/acetone solutions have low viscosity and a high rate of solvent release. Consequently, high solids coatings can be applied quickly.

Continuing Plastiatrics studies by Dow Coatings Technical Service Engineers are constantly developing new data and information on all phases of plastics formulation, design, molding and finishing. For further information on these studies, write THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Department 2392DH10.

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THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

Establishing the quality control of packaging components

By Bernard F. Major, *Manager, Packaging Laboratory and Receiving and Stores Division, Ortho Pharmaceutical Corporation, Raritan, New Jersey*

Controlling quality of in-coming packaging supplies is equally as important as having specifications for these materials. According to Mr. Major, a program to control quality is basically one of sound human relations, rather than of mathematics or statistics. In this article, he tells what basic information is necessary for establishing a quality control program for packaging materials, and how such a system operates.

Quality control programs are most frequently thought of as $\overline{X}$ and R charts, statistical probabilities, and other mathematical manipulations. If this were so, it would make all of our jobs much easier. However, a quality control program for packaging components is basically a sound human relations program.

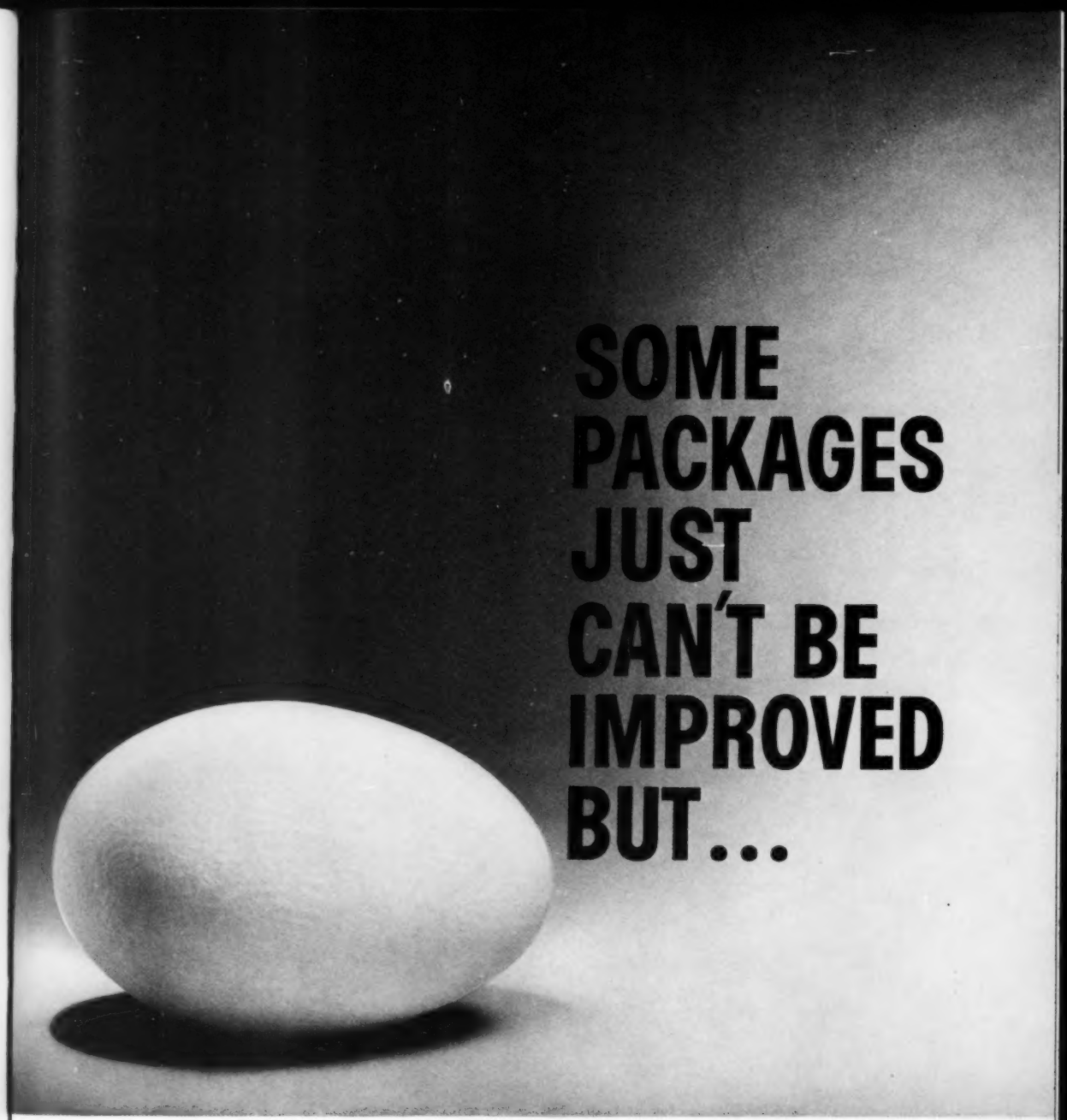
Whether you have a "use-it-and-see policy," a spot receiving inspection, or a full-scale package laboratory, the methods explained in the following pages will cover many of your current problems.

Normally, the first step toward a quality control program is adopting a spot check of packaging materials upon receipt. Though better than no inspection, spot checking does not produce scientific information. **Only when 100 per cent of the shipment is defective, will the spot check be as indicative as formal sampling.**

Usually, only a portion of the shipment is defective. When the percentage defective is 10 per cent or less, the chance of finding it in a spot check is unlikely. Yet the company will be quite unhappy if 10 per cent of a shipment stops its production line. Of equal, if not of more, importance, is the disrupting influence this produces on the relations between many departments within the company, between the company and its suppliers, and between the company and its customers.

With skillful management and administration, existing facilities and labor might be reorganized gradually to form a sound control program which could actually prevent most problems and at the same time reduce costs. If it were

Bernard F. Major has been associated with Ortho for 13½ years. Previously, he was employed by the Phelps Dodge Company and the E. I. du Pont de Nemours and Company (Inc.). He attended Syracuse University and is presently in his senior year at Rutgers University working toward a B. S. degree in marketing. A professional member of the Packaging Institute, he serves on the Drug and Pharmaceutical committee.



SOME PACKAGES JUST CAN'T BE IMPROVED BUT...

. . . others can, and improving them is our specialty. Plax concentrates on packaging in plastics. We design and manufacture, in hundreds of shapes and sizes, plastic containers that squeeze, spray, pour, drip or "carry"—for foods, drugs, cosmetics, detergents and industrial liquids. Some examples of packaging designed by Plax for leading companies are shown on the pages following.

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PLAX
GIVES A PACKAGE
A PLUS

YOU'RE IN THE BEST OF COMPANY.

Today's plastic containers, properly designed and fabricated, are far more attractive, safer and easier to handle than glass or metal. More important, the modern touch of "squeeze-bottle" plastic can move your products off the store shelf quickly and profitably. Many companies, once doubters, are now enthusiastic users.

WHEN YOU USE PLAX CONTAINERS

The large staff of Plax designers and engineers, working with your specialists, can give your package unique styling and functional advantages. Plax is the foremost producer of plastic containers, with the largest manufacturing capacity in the industry.

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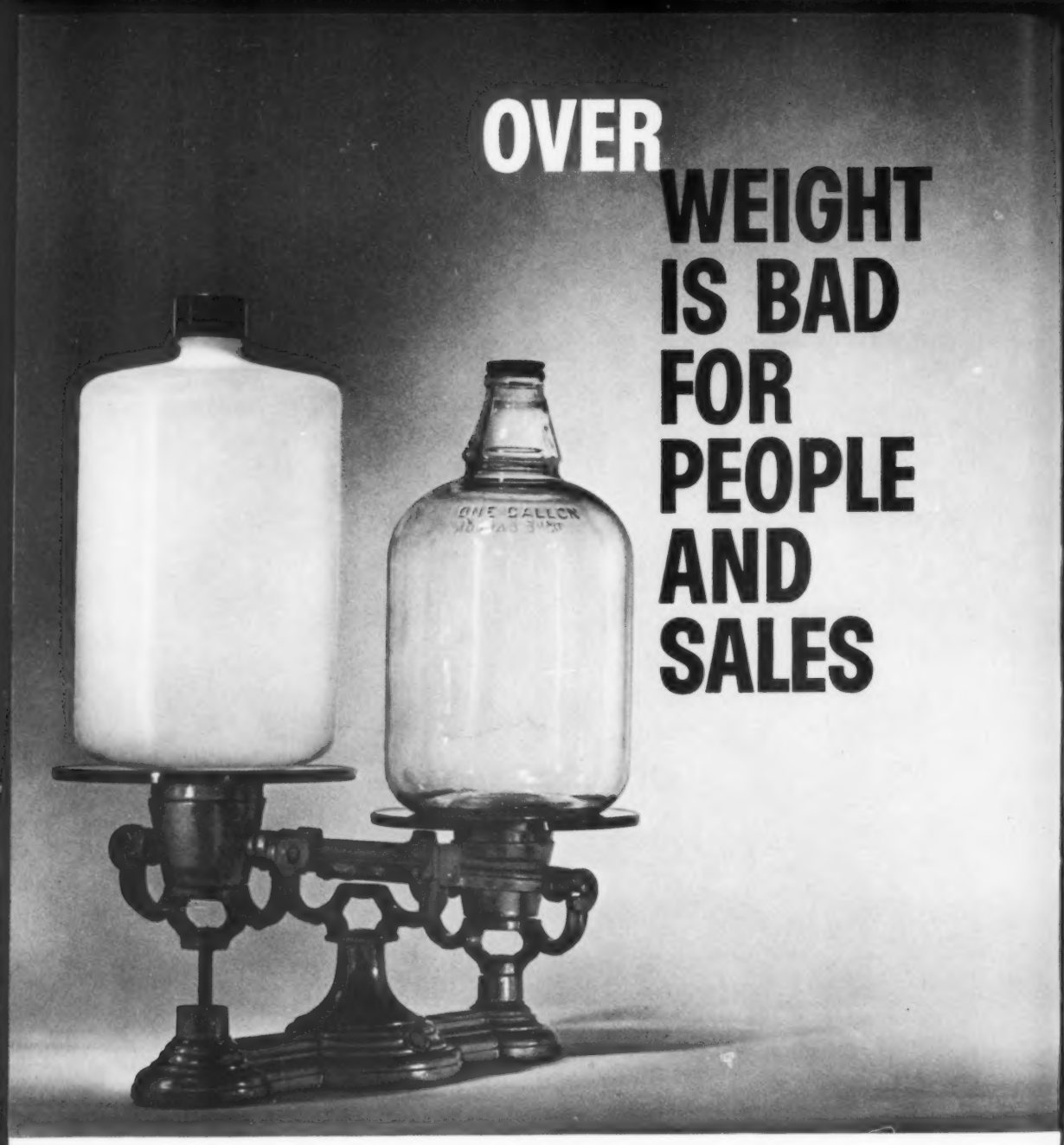


For over 100 years, shippers have used heavy, old-fashioned glass bottles. The new square plastic 1-gallon container by Plax, shown here, weighs only 3 ounces —15 times lighter than the glass bottle it replaces! Startling savings in freight costs, too, and no breakage or disposal problems. Industry is buying them by the thousands for shipping a wide variety of liquids...
from chocolate syrup to sulfuric acid.

Plax Corporation, Hartford 1, Conn.
In Canada, Plax Canada Ltd., Toronto

PLAX

PLAX GIVES A PACKAGE A PLUS

possible to list all the costs incurred as a direct result of defective material, you would find listed such hidden items as:

1. Lost time—of all the individuals required to negotiate which might include the suppliers, purchasing agents, secretaries, and personnel in receiving, accounting, sales promotion, and so on.
2. Lost production labor—expended on a product which is returned, or one which will not sell.
3. Lost material—where materials are destroyed by you or your supplier.
4. Increased cost—unnecessary material and labor costs incurred by the supplier are charged to you eventually. They run their business as you do, for a profit.

Basic Information Required

If the true costs resulting from defective material were totaled, the figure would be impressive, and more than enough to conduct an excellent control program. The type of program established in each company will usually be different. If specifications have been established, you will have the basic information required to set up a program in your company.

Basic information necessary is:

1. A listing of specifications which could affect your company's operations (this indicates the coverage of the program).
2. The importance of each specification in terms of critical, major, or minor* (this helps determine the sample size).
3. What tolerances can be endured (this helps define a defect).
4. What number of defects in a given lot can be overlooked (this restricts judgments and opinions, and realistically sets an [AQL] acceptance quality level).

Know frequency of purchases. In addition to the information you already have, you will need to know the frequency of purchases of the various packaging materials. This can be determined easily by reviewing the receiving reports issued in three successive months. This should be a fairly good representation of the frequency of receipts. Record the number of shipments of each item received during the three months. The receipts can be classified by their basic composition such as metal, glass, kraft, and so on, as shown in Fig. 1.

The time required to inspect one average receipt can be determined after you have established a rough inspection procedure and are able to personally perform the inspection to record the time. With an inspection procedure, one shipment from each group of basic materials should be inspected and recorded. At most, you will have about nine types of basic materials—the last being a miscellaneous grouping.

When you have determined the approximate time required for one component of each group, you can then multiply this by the average number of receipts within each group over a one-week period and calculate the time required to conduct your tentative program. Adjustments can then be made to the tentative program if you do not think the time required is justifiable.

Component Groups	Number Of Receipts In 3 Month*	Number Of Averages Weekly Receipts	Time Required To Inspect One Average Receipt (min.)	Time Required To Inspect All Receipts In One Week (min.)
Laminations	135	10.3	23	236.9
Paper	720	55.3	14	774.2
Paperboard	150	11.5	18	217.0
Kraft	600	46.2	22	1014.2
Plastic	78	6.0	16	96.0
Textile	6	0.4	12	4.8
Metal	120	9.2	20	184.0
Glass	225	17.3	19	328.7
Miscellaneous	300	23.0	21	483.0
Total	2334			3338.8

*To calculate average weekly receipts, divide receipts for 3 mo. by 13.

1 KNOWLEDGE OF FREQUENCY OF PURCHASES can be determined easily by reviewing receiving reports issued in three successive months, and recording number of shipments of each item received during this time. Receipts can be classified by basic composition, such as metal, glass, etc.

Establish Tentative Program

In simulating an inspection, the first question to be answered is how large a sample should be taken from the shipment. There are many books which discuss sample size and its relation to statistical probability. These can be picked up at any good library. However, most of the hard-cover books are lengthy and cover many statistical methods other than sampling.

(*Turn page*)

Where item is not destroyed and evaluation is quick and inexpensive:		
For those aspects which you desire:	a. 99% assurance	400 units
	b. 97%	225
	c. 95%	150
Where costly item is destroyed, or test is time-consuming or expensive:		
Cost of sample or test is:	a. questionable	36
	b. appreciable	12
	c. restrictive	2
	d. prohibitive	*

*Samples are tested once each year.
Notes: Assuming single sampling is selected.
Numerals shown are for a given lot size.

2 COST OF TEST IS ANOTHER REGULATING FACTOR in selecting sample size which will vary for attribute or quality of packaging component being evaluated. As each characteristic is evaluated to determine number of samples to be inspected, sampling plan might look like this.

*Editor's note: In his article, "Setting specifications for package components," PACKAGE ENGINEERING, 4 (1959), No. 6 (June), p. 37, Mr. Major defines "critical," "major," and "minor" as: "A specification should be termed "critical" if there is a possibility of its causing stoppage of any operation; not meeting legal requirements; causing harm or great inconvenience to production, shipping, the consumer, or anyone within the distribution cycle, or causing a reduction in sales.

"A specification should be termed "major" if there is a possibility, not of stopping, but of decreasing operating efficiency; of reducing your determined quality levels; or of being objectionable to your customers.

"A specification should be termed "minor" if it is shown in the final specifications sheet and is less than the qualification given to a major specification as stated above."

Paperboard Components Inspection Results

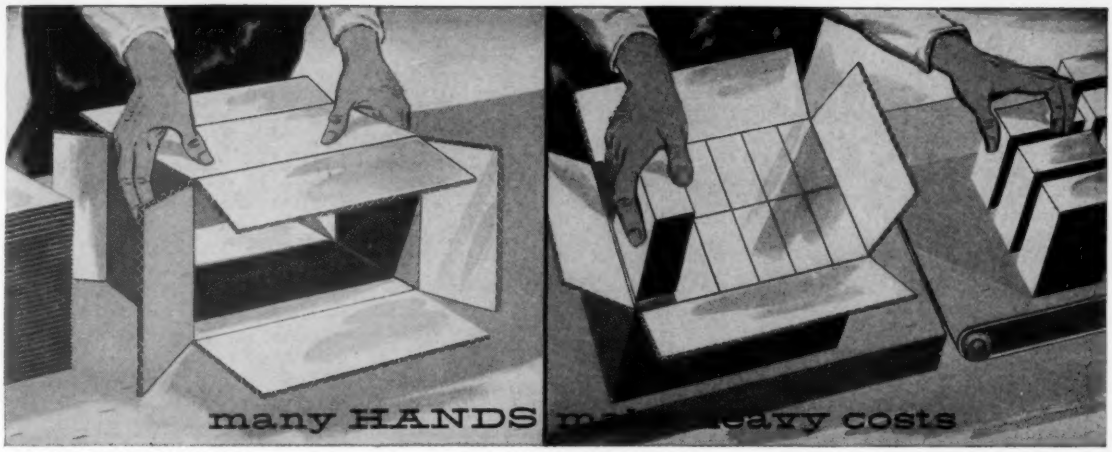
Item _____ Quantity _____

Code _____

Qualities	Sample Size Or MIL Std. Test Level	Time Of Evaluation	Cost Of Component	Total Cost Time And Material
BOXBOARD:				
Type	12			
Basis weight	12			
Caliper	12			
Color	36			
Bending Qualities	12			
Grain	12			
Aging	10			
Foreign matter	111			
Odor	111			
Warpage	111			
BOX:				
Style	111			
Dimensions:				
Linear	12			
Angles	12			
Curves	12			
Order of panels	1			
Direction of printing	1			
COATINGS:				
Coverage	111			
Color effect	111			
Tackiness	10			
Flexibility	12			
Aging	10			
GLUE:				
Adhesion	12			
Coverage	12			
PRINTING:				
Aging	10			
Register	1			
Color	36			
Copy	2			
Bleed	1			
Fill-up	1			
Feathering	1			
Smudging	1			
Tackiness	1			
Fade-out	1			
Misses	1			
Scuffing	1			
Picking	1			
Flexibility	12			
MANUFACTURING MALFORMATIONS:				
Glue lap alignment	1			
Flap tacks	1			
Glue visability	1			
Make up	1			
Cleanliness	111			
Scoring	1			
Cutting	1			
METHOD OF PACKING:				
Method	1			
Damage	111			
Warpage	111			
Count				
CASE SPECIFICATIONS:	1			

3 **DURING PROCEDURE OF ANALYZING EACH SPECIFICATION AND ATTRIBUTE,** a tentative sample size can be established. This form can be used for this purpose; also, by inspector after sample size is determined.

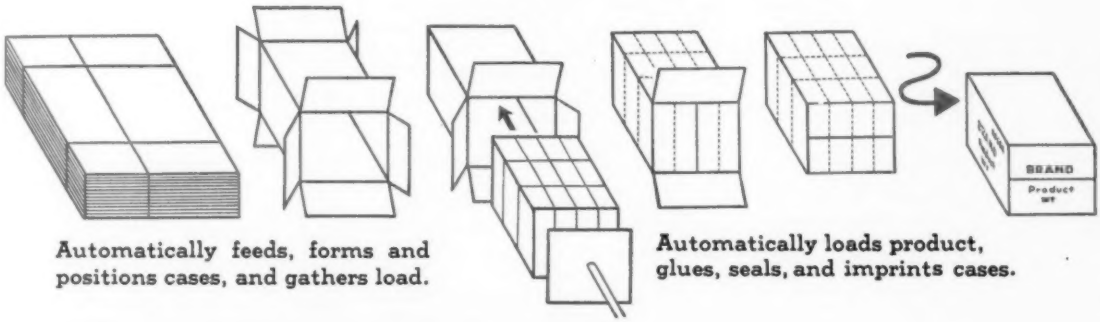
(*Turn page*)



let Packomatic®
T.M. Reg. U. S. Pat. Off.

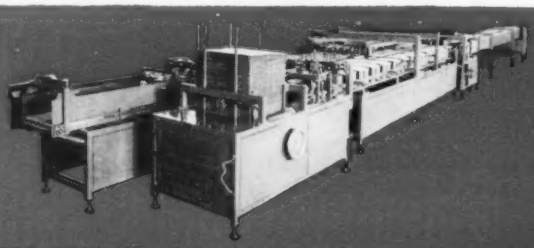
equipment do any or all your casing operations

AUTOMATICALLY



Automatically feeds, forms and positions cases, and gathers load.

Automatically loads product, glues, seals, and imprints cases.



FOR EXAMPLE: Packomatic designed for case-packing of Imperial (5 Qt.) gallon cans of oil for Esso Standard feeds and forms cartons, loads and seals them, automatically — six cans per case, twenty-five cases per minute.

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PACKOMATICS include Case Sealers • Case Opener-Loaders • Case Packer-Gluers • Case Imprinters • Bale Sealers • Automatic Equipment for Shelf Carton Making, Feeding, Filling and Closing • Round Paper Can Mfg. Equipment

For casing round, square, rectangular or free-form packages of virtually any size

You need not be a **big** company to enjoy the economies of Packomatic equipment. If your volume requires even one person to hand-form cases, hand-fill, hand-seal, or hand-imprint them, then a Packomatic machine can be a sound investment. Only a minute or two of attention at infrequent intervals is needed even for a **complete** automated Packomatic **line,** capable of matching the output of a dozen pair of hands. And in addition to reducing direct labor production costs Packomatic can, by utilizing end-opening shipping cases, reduce your paper-board costs up to 25%. And mechanically end loaded cases are stronger because the flaps give added resistance to weight and shock. In addition they stack better because their uniformly flat sides enables keying of pallet loads. Write, wire or phone us for facts on how to reduce your case packing costs.

See our revolutionary OMNIMATIC-ROTOPRESS. Booth #823 – Nov. PMMI SHOW – New York Coliseum

Aluminum Foil Packaging Plastic Film Laminations

Report No. 23 of a Series by Reynolds Metals Co.

The important functional properties of aluminum foil for packaging can obviously be supplemented by combining aluminum foil with other materials. Previous reports in this series have discussed many combinations.

The Broadest Field

The broadest field for such expansion of packaging properties is the combination of plastic films and coatings with aluminum foil. Various plastics can add heat sealability, improved flexibility, scuff resistance and greater overall durability to the protective qualities inherent in the foil alone. In fact, combinations of foil with plastic films have produced a whole new family of materials — making possible flexible packages, and also unit packages, for products which formerly could use nothing except conventional rigid containers.

Adhesive Laminating

In early developments, these combinations were achieved by adhesive laminating. This type of process is too expensive for many packaging applications even when the laminate is a simple two-layer combination. As laboratory exploration advanced into more complex structures, the cost increased — limiting the application of some materials to products requiring very special protection. During this time, and pending a solution to the economics of the problem, valuable research data was accumulated in complex laminates having many properties. These were sometimes difficult to trace to particular components, where several contributed in varying degree. But basic categories were established.

For example, combinations of polyester films with aluminum foil provide materials with exceptional strength. Reverse-printed cellulose acetate or cellophane films laminated to foil provides materials with high gloss and aesthetic properties. Saran and pliofilm in combinations with aluminum foil contribute properties of gas impermeability.

The economics of combination plastic-foil packaging was revolutionized by the development of extrusion coating. This high speed process extrudes suitable resins and polyolefins under pressure and heat directly upon the aluminum foil — to serve either as a final coating or layer of the structure, or to act as an adhesive for a further layer. Cost is much reduced, as compared to regular laminating. Therefore, this type of protection becomes available to a wide and steadily increasing variety of products.

Pilot Plant Operation

Recognizing the vast possibilities, the Reynolds Metals Company pioneered in this field. The Pilot Plant of Reynolds Research and Development Laboratory is equipped with the most modern plastic extrusion machinery — including a web carrying unit having turret unwinds, turret rewinds, an extra large cooling drum, slitting knives, and a secondary unwind to permit laminating two webs with the extruded plastic. This plant manufactures samples and evaluates all materials under carefully controlled laboratory conditions, maintaining careful records. Only by such control can the right selection for a packaging application be made and duplication of the material on the production line be assured.

Besides its Pilot Plant operation, the Reynolds Metals Company also has production extruders strategically located across the country, to supply packaging material needs after evaluation and selection.

Thorough Materials Evaluation

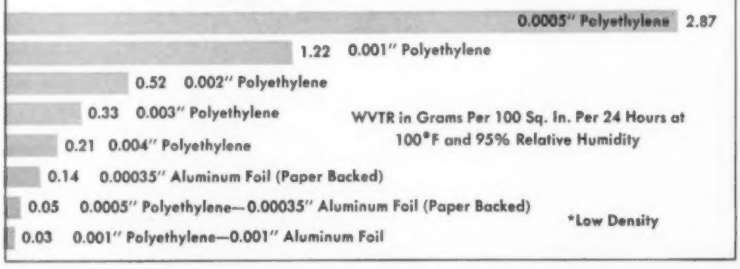
The Pilot Plant, with its complete equipment, makes possible the thorough evaluation of all materials, including the variations in performance characteristics achieved by variations in the components. For instance, the plastic resin most frequently utilized for extrusion coating to date is polyethylene. It has the unusual properties of heat sealability at relatively low temperature, low Water Vapor Transmission Rate and chemical resistance, coupled with ease of processing. But variations in the polyethylene specification can produce a wide variety of characteristics, which must be thoroughly evaluated so that choices for particular end uses can be based on actual test data.

The accompanying chart shows how effectively even the lightest gauges of aluminum foil together with an extremely light coating of polyethylene will achieve Water Vapor Transmission Rates greatly superior to much heavier gauges of polyethylene film by itself. In addition, economies can be effected by the combination.

For Further Information

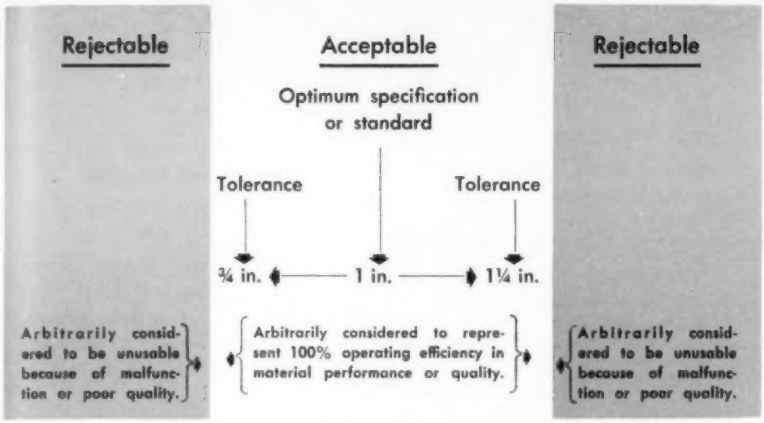
Many plastic and aluminum foil combinations originally custom made by Reynolds for particular products are now on the market. One of them may well suit your needs. Or adaptations can be developed and thoroughly tested in the Pilot Plant. For further information on this or any phase of aluminum foil packaging, call the nearest Reynolds sales office. Or write to **Reynolds Metals Company,** Richmond 18, Virginia.

Water Vapor Transmission Rates of Various Gauges of Polyethylene* and Aluminum Foil Laminates


0.0005" Polyethylene 2.87
1.22 0.001" Polyethylene
0.52 0.002" Polyethylene
0.33 0.003" Polyethylene
0.21 0.004" Polyethylene
0.14 0.00035" Aluminum Foil (Paper Backed)
0.05 0.0005" Polyethylene—0.00035" Aluminum Foil (Paper Backed)
0.03 0.001" Polyethylene—0.001" Aluminum Foil
WVTR in Grams Per 100 Sq. In. Per 24 Hours at 100°F and 95% Relative Humidity
*Low Density

© 1959 by Reynolds Metals Company

See Reynolds shows—James Michener's "ADVENTURES IN PARADISE" Monday nights and "ALL STAR GOLF" every Saturday ABC-TV Network.


Rejectable
Acceptable
Rejectable
Optimum specification or standard
Tolerance
Tolerance
¾ in.
1 in.
1¼ in.
Arbitrarily considered to be unusable because of malfunction or poor quality.
Arbitrarily considered to represent 100% operating efficiency in material performance or quality.
Arbitrarily considered to be unusable because of malfunction or poor quality.

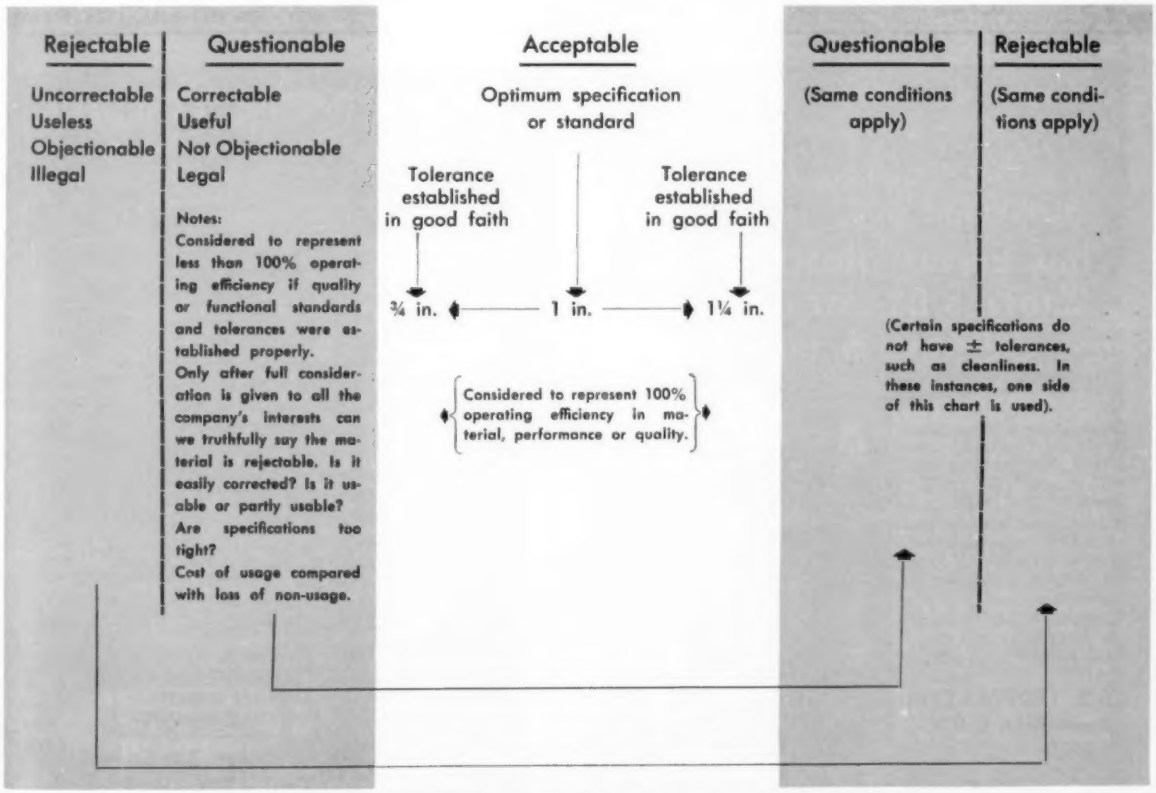
4 **NEW CONCEPT OF QUALITY CONTROL** is necessary when considering package components. On either side of optimum for each attribute, is tolerance which supplier usually requires.

A good working tool is Military Standard 105A.† This booklet contains a simple method of determining sample sizes. The method allows you a choice of three inspection levels (sample sizes). Each gives you a different degree of assurance.

†Suprintendent of Documents, U.S. Government Printing Office, Washington, D. C., price: approx. $0.50.

As an example, if you want 99 per cent assurance that you will properly predict the per cent defective in a lot, a sample size of 300 may be required. If you will be satisfied with 95 per cent assurance, a sample size of 150 may suffice. The government publication also indicates at what number of defects the shipment should be accepted and rejected for a given AQL.

To further reduce the sample size, a choice of single, double, or sequential sampling is offered. Where multiple sampling is used, a smaller sample is evaluated. If defects are found, a second or more samples must be taken. Where large volumes of components are inspected and the defects being sought can be quickly evaluated, the sampling schedule above is ideal. However, this is not usually the case. (*Turn page*)


Rejectable
Questionable
Uncorrectable
Useless
Objectionable
Illegal
Correctable
Useful
Not Objectionable
Legal
Notes:
Considered to represent less than 100% operating efficiency if quality or functional standards and tolerances were established properly.
Only after full consideration is given to all the company's interests can we truthfully say the material is rejectable. Is it easily corrected? Is it usable or partly usable?
Are specifications too tight?
Cost of usage compared with loss of non-usage.
Acceptable
Optimum specification or standard
Tolerance established in good faith
Tolerance established in good faith
¾ in.
1 in.
1¼ in.
Considered to represent 100% operating efficiency in material, performance or quality.
Questionable
(Same conditions apply)
Rejectable
(Same conditions apply)
(Certain specifications do not have ± tolerances, such as cleanliness. In these instances, one side of this chart is used).

5 **TOLERANCES SET IN GOOD FAITH** may prove too broad or too rigid after component has been used for a time. They should be changed when necessary, which results in this more-workable concept. (Diagram is similar to Fig. 4, but adjusted to conform to true circumstances.)

Out of Tolerance Report

To_____
Buyer
Production Manager
Product Manager
Traffic Manager
(Back to you)

NAME OF ITEM _____ CODE NUMBER _____
SUPPLIER _____ PURCH. ORDER NO. _____
QUANTITY _____ REC. REPORT NO. _____ DATE RECEIVED _____

The material covered by this report has been inspected and found to be outside specifications. Variance (s) noted below. This shipment is being held, pending the return of this form.

_____
_____
Inspector _____ Date _____

Disposition Comments: _____
_____
_____

Please initial and date below if this variance is insignificant. Otherwise please comment above.

Buyer _____ Date _____
Production Mgr. _____ Date _____
Product Mgr. _____ Date _____
Traffic Mgr. _____ Date _____

6 **INSPECTOR ACCEPTS MATERIALS WITHIN SPECIFICATIONS.** Beyond this he only reports materials to be outside tolerances and might use this for notifying proper persons involved.

In order to evaluate certain qualities or attributes, it may be necessary to destroy the component—such as a crush test on tubes. In instances such as this, the value of the protection should be compared with the cost of the component. You may decide to evaluate only a few, possibly only one, if the cost of the component is extremely high. You may even decide to evaluate less than one by performing an evaluation on one from every third shipment.

Cost Of Test A Factor

Another regulating factor in selecting the sample size is the cost of the test or assay. If you do not have the facilities and must send components to an outside laboratory, you may decide to evaluate the quality or attribute at certain periods such as once every six months.

As you have surmised, the sample varies for the particular attribute or quality being evaluated. As you analyze each attribute and quality, and tentatively establish the number to be inspected, your sampling plan might look similar to that shown in Fig. 2.

As you proceed analyzing each specification and attribute, you can tentatively establish a sample size for each. The form shown in

New PACKAGE COMPRESSION TESTER

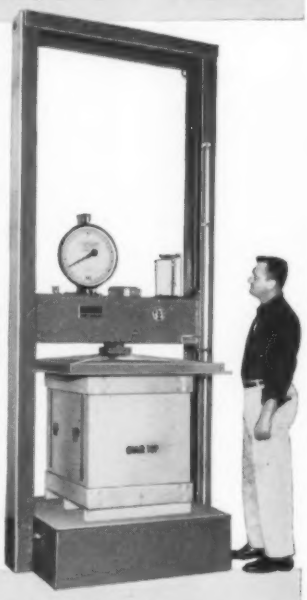
Built specifically for tests on shipping containers, packages and packaging materials.

Rugged and simple in construction, this new L.A.B. tester's relatively low initial cost makes it ideal for the container industry.

Available in 2,000, 3,000, 5,000 or 10,000 lb. capacity, with load opening 40" sq. x 48", 60" or 72" maximum box height.

Compression load is indicated by precision dynamometer scale. A load vs. deflection recorder is optional.

Write for full information on this unique and practical compression tester.



L.A.B. CORPORATION
Skaneateles 5, N.Y.

A certified NSTC Testing Laboratory. Also makers of Conbur Incline-Impact Testers, Vibration Testers, Drop Testers and Quick-Release Hooks.

Circle No. 241 on Card, Page 97

Shatterproof, Clear Plastic Containers
for packaging individual components!

• For individual packaging or kits • Wide range of sizes • 1/5 the weight of glass • Lower shipping costs • Can be printed or decorated • Low cost • Reusable • Also Available in Color.

WRITE FOR COMPLETE PRICES AND LITERATURE

LERMER PLASTICS, INC. 540 South Ave. Garwood, N. J.

PIONEERS AND SPECIALISTS IN PLASTIC CONTAINERS SINCE 1919

Circle No. 242 on Card, Page 97

Fig. 3 can be made up which could also be used as a worksheet by the inspector.

When you have selected a tentative sampling plan and inspection procedure, adjustments should be made until you have established the best program you think your company will accept. **At this point, you have a sampling program and an inspection procedure.**

If put into effect, the system would automatically approve materials within specifications and reject those outside specifications. A certain amount of the materials rejected would be returned and accepted by the supplier as obviously defective material which it should not have allowed to pass. There is an area between the good and the definitely bad which must be handled in a special way.

Tolerances Usually Necessary

When considering package components, a new concept of quality control is necessary which is illustrated in Fig. 4. In any control program, there is the target or optimum specification for each quality or attribute. This is commonly called the "specification" or "standard." On either side of this, there is usually some leeway allowed which the supplier requires, called the "tolerance." Normally, materials falling between the two tolerances are considered acceptable. Those falling outside the tolerances are considered rejectable.

However, if we were to logically plot the conditions, we would find the following to be more true: We establish an optimum or standard specification which, of course, we will change if we find it causes a tight fit or any other noticeable difficulty. The tolerances established in good faith may prove too broad or too rigid. This you will discover after operating for a time. With a change in season, paper becomes more moist or dry. A new supplier, a new machine, or even a new employee at the supplier may bring this to light. To illustrate a more workable concept, the diagram in Fig. 4 has been adjusted to conform to the true circumstances, and is shown in Fig. 5.

How Program Operates

Most companies today do not have a control program. They have a program for a controller who is generally a man with broad shoulders. From the diagram in Fig. 5, you can see why. Like most problems, however, careful analysis and proper handling can reduce it to an unnoticeable factor.

If the specifications and tolerances are established after careful consideration, the problems which arise will be few and generally of a minor nature. Therefore, we can allow the inspector to accept materials within specifications with no further action required.

Beyond this point, the inspector only reports. He does not reject materials based upon his judgment. His report indicates material received to be outside the tolerances. For simplicity, we will call this an

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SIMPLIFIED PACKAGING FOR FRAGILE PRODUCTS
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SEND FOR THIS SUS-RAP PACKAGE ENGINEERING MANUAL . . . TODAY!
SUS-RAP is produced in widths, slot sizes, and various strength qualities to ECONOMICALLY package YOUR product . . .
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Model SE Carton Forming & Lining Machine
automatically forms and lines up to 120 cartons per minute
Let our engineers show you how Peters can help you do a better job faster—and at lower cost!
Another high-speed, cost-cutting packaging machine—Peters Model SE Carton Former and Liner—cuts roll-fed paper to proper size liner sheets . . . then folds liner sheets and low cost carton blanks together to form perfectly shaped lined cartons. Can be made adjustable to set up a variety of sizes for lard, shortening, tea bags, cookies, etc. Write for catalog describing this and other Peters packaging machines.
For 60 years originators and builders of high speed automatic packaging and bakery machines.
Peters
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All Phones: LOngbeach 1-9000

U.S.I. POLYETHYLENE NEWS

A series for plastics and packaging executives by the makers of PETROTHENE® polyethylene resins

OCTOBER, 1959 — U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation — 99 Park Ave., N. Y. 16, N. Y.

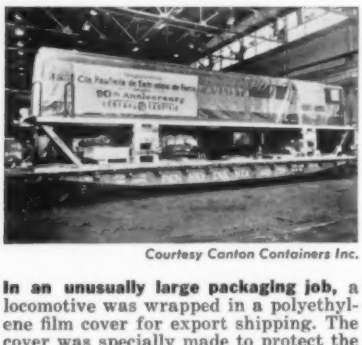
Packaging Notes

Lightweight polyethylene-coated corrugated containers are being used to ship heavy electric typewriters.

Polyethylene was found to be the only material that did not damage the finish of the typewriters. A polyethylene-coated corrugated insert fits over the typewriter inside the container. This liner prevents damage to the typewriter, even if the box is overturned. The box cuts costs 30 percent, and volume 40 percent. Stacking strength is increased 40 percent.

A semi-rigid polyethylene bag inside a corrugated box is being used to package a liquid industrial deodorant. The containers, in quart and gallon sizes, pour easily and are convenient to handle.

This method of packaging reportedly eliminates the problems of freezing and bottle breakage and requires no deposit or return. The new containers require less transportation and storage space than glass or metal ones, providing lower handling costs.



Courtesy Canton Containers Inc.

In an unusually large packaging job, a locomotive was wrapped in a polyethylene film cover for export shipping. The cover was specially made to protect the locomotive from dirt, dust, and water spray during overseas shipment.

A new sealing machine for polyethylene bags reportedly provides substantial savings in packaging costs. The machine features an automatic sealing and cut-off device designed to save up to an inch of film length per bag. It eliminates conventional tabs and is claimed to save up to 15 percent in material costs.

Strong, flexible bags with many properties comparable to metal cans are being produced to package foods. These bags are made of aluminum foil laminated on both sides with polyethylene film, and coated on the outside with cellophane. They are impermeable to gas and moisture. The bags will heat seal, have high impact strength, and will stretch up to 28% (in machine direction) before rupture. They may be used for vacuum packaging, dehydrated food packaging, liquid food packaging. The packages can be boiled.

Growing Market for Polyethylene Film Seen in New Construction Applications

Film Makes Ideal Moisture Barrier for House and Highway Construction

A burgeoning market for heavy polyethylene film is developing out of new uses for the film in the construction industry. Three properties of polyethylene film have been chiefly responsible for its popularity with builders. It is an excellent moisture barrier. It is light-weight, yet strong. It is inexpensive.

Polyethylene sheeting in 4 mil thickness is placed on freshly laid concrete after a film of water is sprayed over entire area. Boards are placed over the joints and edges and left in place for at least 36 hours. Sheeting can be re-used for this purpose, or used as waterproofing under next slab in multi-dwelling construction.

Construction men are using polyethylene film as a moisture barrier under foundation slabs and concrete highway sections, between interior and exterior walls, and as a lining for crawl spaces. On one recent construction job, 70,000 square feet of 4 mil clear film was used under a concrete slab. Installation was facilitated by the light weight of the film — less than 20 pounds per thousand square feet. In house and highway construction, the same film used under concrete as a barrier, is frequently reused after first serving as a cover over other concrete.

On large construction jobs, polyethylene film has proved invaluable as an inexpensive covering for open, unfinished work. The film permits solar heat and light to enter, keeps out wind and dirt.

In house construction, film is being used for window and door flashing and as an under layer for shingle roofs. Film is being laid under shower stalls and in other parts of the house where moisture and water seepage is a problem.

The future of polyethylene in the building industry continues to be brightened by new applications. For example, "bubble houses" held up by air pressure show promise as economical shelters for construction work or for temporary storage. Polyethylene-coated plywood concrete forms that are self releasing have been suggested. New uses such as these promise to continue the spectacular growth which polyethylene has shown over the past few years.

Unsupported Polyethylene "Bubble" Houses Chickens

An air supported plastic shelter, used as a low-cost house for poultry research, has been built at a leading agricultural university.

No inside supports are used for the 10 by 20 foot shelter built with 4 mil polyethylene film. A one eighth HP motor keeps the quonset shaped shelter inflated. It is estimated the building will endure 60 mph winds and support a foot of snow. The success of the shelter suggests its use in meeting temporarily expanded farm storage and poultry shelter needs.

U.S.I. To Co-Sponsor Museum Packaging Show

U.S.I. will co-sponsor an international packaging show at the New York Museum of Modern Art from Sept. 9 to Nov. 9. Several hundred commercial and industrial packages selected from ten countries will be presented. They will range from wrapping materials to a 370 cubic foot container.

The exhibition is intended to re-examine and broaden the concept of packaging in relation to the great variety of products produced today. Outstanding examples of graphic and industrial designs will be shown with emphasis on imaginative use of new and old materials. Experimental and industrial packaging seldom seen by the public will also be exhibited along with well-known commercial applications.

New Slitter Is Faster, Reduces Trim Losses

A compact new machine is reported to shorten slitting time for polyethylene film and to reduce trim losses.

It normally takes 45 minutes to cut a 10,000 ft. roll of film, using a conventional slitter and winder. The new machine is reported to cut the same length of film — on the roll — in five minutes.

When the film is slit on the extruder, three to four inches of selvage material is usually lost. The new machine reduces wasted selvage to as little as $\frac{1}{16}$ of an inch. The new slitter eliminates the problem of fusing at the edge of the roll. The machine is said to cut film in gauges from $\frac{4}{10}$ to 10 mil, in any width up to 72 inches.

"out-of-tolerance report." To give you a preview of how this report will be used, visualize a report as shown in Fig. 6, carrying the basic information necessary to make a decision, accompanied by a few samples.

This form then goes routinely to the few people who are involved. Usually it will be the buyer, the production manager, the product manager, the traffic manager, and you. The buyer would represent the purchasing department's interest. He can reject the shipment, if the variance is a purchasing consideration, by a proper notation and return the form to you.

If the variance is in dimension, it will be passed on by the buyer to the production manager who can determine, by using the samples, if the variance will present any problems. If problems will result, the production manager can reject the shipment by a proper notation and return the form to you. The same process applies to the product manager and the traffic manager.

Several advantages result from this process. They are:

1. The person best qualified to evaluate the variance does so. He also has the facilities on hand to try the material where this is necessary.

2. The reason for rejection is noted on the form which is returned to you. By making adjustments in your specifications, future variances which are satisfactory will not be considered as rejectable. Also, those variances which are most frequently rejected can be classified as rejects. Eventually, you will be able to reject items in this area with assurance and without further consultation.

3. The routing of the form is such that the buyer is informed of every variance; the production manager every variance, except those which involve the purchasing aspect; and so on to the traffic manager who will always be informed of those variances requiring a decision from traffic.

4. The form does not *necessarily* have to be routed to all the individuals shown, however. If the variance is one which is of interest to traffic, the form may be routed to the buyer and traffic, and back to you by scratching off the names of the production and product managers. This abridgement will also speed up the routing. In every instance, the form is returned to you or the person designated to handle this program. Only when the notations on the form indicate unreasonableness or lack of knowledge, will it be necessary for the person handling the program to intercede. By further clarification or questioning of the notation, you will be able to determine the true status of the variation.

As experience is attained, this program should work very smoothly. Again it should be emphasized that before instituting the program, it should be thoroughly discussed with each person involved.

Hand in hand with Mr. Major's views on controlling quality of packaging components go those of Mr. McGuire on adhesives—an important raw material of most packages. His discussion on specifying and controlling packaging adhesives begins on Page 71.

Advantages

The advantages of a control procedure of this type are many. The obvious ones are:

1. **Improved manufacturing efficiency** by advanced knowledge of quality received. Machine downtime, labor loss, and schedule changes covered by defective materials will be practically eliminated. Manufacturing can prepare itself to handle slight variances when to its advantage.

2. **Reduced internal complaints** and disagreements concerning packaging component quality. These reach an insignificant point through the advanced knowledge and agreement of the parties concerned.

3. **Elimination of costly 100 per cent inspections.** This is true in many instances where a rigid control is exercised.

4. **More consistent quality at the consumer level.** This is attained through control of quality.

5. **Often improved quality at the point of manufacture** (the supplier). This results through the return of materials and particularly through warnings which can be forwarded when quality is found to be falling.

6. **No lost space, capital, and purchase lead time** by the storage of defective material for weeks or months before being uncovered.

With a program such as this, the responsibility for its execution can be centralized, while the multitude of interest throughout the company is encompassed. Such a program is necessary because of the growing complexity of packaging interests in modern industry.

(End)

Waldorf KNOWS *Packaging* AUTOMATION

Waldorf designed this packaging line in cooperation with a major appliance manufacturer. Now 2 men and this machine do the work which formerly required 6 to 8 men. This operation automatically sets up, top seals, loads and bottom seals a regular style container. Waldorf also designed a package using less material, further increasing this manufacturer's saving.

Waldorf packaging experience saves you money

The Waldorf frozen food package closer is one of several machines designed by Waldorf to speed frozen food packaging. It automatically closes and locks over 10,000 cartons per hour. Travel of the carton through the machine is completely automatic. This Waldorf closer may be used with the Waldorf former, Waldorf interleafer or both for full automation.

Few companies, if any, can match Waldorf when it comes to machine designing and machine building. Waldorf pioneered customer plant labor-saving, package handling equipment nearly 20 years ago . . . this experience has enabled us to solve many of the complex problems of automated packaging.

If you are an executive looking for money-saving, labor-saving ways to package your products, write Waldorf today or telephone Midway 6-7321.

WALDORF **PAPER PRODUCTS COMPANY** ST. PAUL 14, MINN.

For more information circle No. 247 on Reader Service Card, Page 97

ARMED WITH THE BASIC DATA BELOW, the packaging engineer can evaluate new adhesives submitted to him, and he can control quality of his adhesive supply:

1. **Supplier and adhesive code**
2. **Intended use**
3. **Date of adoption**
4. **Machine types which use the adhesive**
5. **Adhesive base**
6. **Adhesive solids**
7. **Viscosity and its characteristics**
8. **Recommended diluents**
9. **Recommended solvents**
10. **Storage life**

Specifications/control of packaging adhesives

By E. Patrick McGuire, *Technical Service Manager, Packaging and Specialty Products, The Borden Chemical Company, Division of The Borden Company, New York*

With the growth of the packaging industry has come a need for a more precise knowledge concerning the nature of all raw materials employed in the packaging operation. By no means can industrial adhesives be excluded—the adhesive is an important raw material of most packages. Because of these facts, it is important that the packaging engineer be familiar with the facets surrounding packaging adhesive specifications and the significance of this data.

SETTING QUALITY CONTROL SPECIFICATIONS

Arriving at adhesive specifications is very likely to involve many inverse relationships. In any new packaging adhesive use, the consumer is likely to try many adhesives on an operation until he resolves his trial procedures and arrives at one grade which seems most satisfactory. The specifications for the adhesive type on the operation in question are then written around the adhesive that was found to perform satisfactorily.

This type procedure is inevitable in light of the complexity of many of today's high-speed packaging machines. In adopting this procedure, the packaging engineer (unless he is an adhesive expert) relies on the technical knowledge of his adhesive suppliers. With their experience, and if they know the application of the user, usually they can submit reasonably satisfactory samples for the initial trial periods of the operation.

However, **once the adhesive has been selected and is performing its function properly, the packaging engineer must now turn to the task of setting a raw material quality control specification for the adhesive.**

Ten Basic Points

The packaging engineer must have on hand a minimal amount of information on each adhesive he utilizes in his plant. This information should include at least the following basic data:

1. Supplier's name and adhesive designation
2. Intended use
3. Date of adoption
4. Machine types for which the adhesive is designated
5. Adhesive base
6. Adhesive solids
7. Viscosity and viscosity characteristics
8. Recommended diluents
9. Recommended solvents
10. Storage life

(*Turn page*)

Controlling quality of packaging adhesives can mean the difference between an efficient packaging operation and a poor one. Stressing ten basic points—data with which the packaging engineer should be familiar—Mr. McGuire explains a systematic method of how to control adhesive quality. His discussion, although on adhesives, bears out the importance of controlling quality of packaging components, on which subject, his views closely parallel those expressed in the article on Page 56.

ADHESIVES

Mfgr. _____

Mfgr's. Code No. _____ Plant Part No. _____

Use _____

Date adopted _____ Date discontinued _____

Machine types _____

PRODUCT SPECIFICATIONS:

Adhesive base _____

Total solids _____

Viscosity _____

pH _____

Storage life _____

QUALITY CONTROL TESTS ON SHIPMENTS RECEIVED:

_____

_____

_____

_____

PRODUCT CHARACTERISTICS:

Diluent solvents _____

Clean-up solvents _____

Viscosity properties on aging _____

_____

Color _____ Odor _____

Toxicity _____

Federal Spec. No. _____

HANDLING INSTRUCTIONS:

_____

_____

1 **HANDY REFERENCE FORM** containing basic data required to control adhesive quality. Put on card posted by packaging machine on which adhesive is used, this information would be readily available to persons who actually handle adhesive.

Armed with this basic data, the packaging engineer is in an improved position to assay the state of his adhesive requirements. He can more accurately evaluate new adhesive submissions for an established operation and, more important, he can detect any deviation in adhesive supply.

Fig. 1. shows a way in which this information may be incorporated on a card as a handy reference for anyone who handles the adhesive. As a suggestion, this card, with the pertinent data, could be posted by the packaging machine on which the given adhesive is used. Thus, the operators would be aware of proper handling of the specific adhesive in use.

In order that we may have a more complete understanding of the points listed above, let us examine each of these pieces of data separately.

1. Supplier's Name And Product Designation

For filing and reference purposes, it is best to begin with this basic data. The description should include a full statement of the product number, its trade name, and the particulars of the supplier —including name and address.

This position on a data sheet might also, according to the desire of the packaging engineer, include the points of shipment or the producing plants of the supplier likely to serve his plant. It might also include pertinent statements regarding price, quantity availabilities, and a statement regarding the weight per gallon of the adhesive.

2. Intended Use

Despite the obviousness that this title would seem to imply, **it is nonetheless important that an adhesive specification sheet include this data.** In an era of constantly altering machine procedures, accompanied by a continual introduction of new raw materials, it becomes imperative that such a statement exist. For example, if the adhesive was introduced into the plant for use on waterproof case sealing, the use data might be stated:

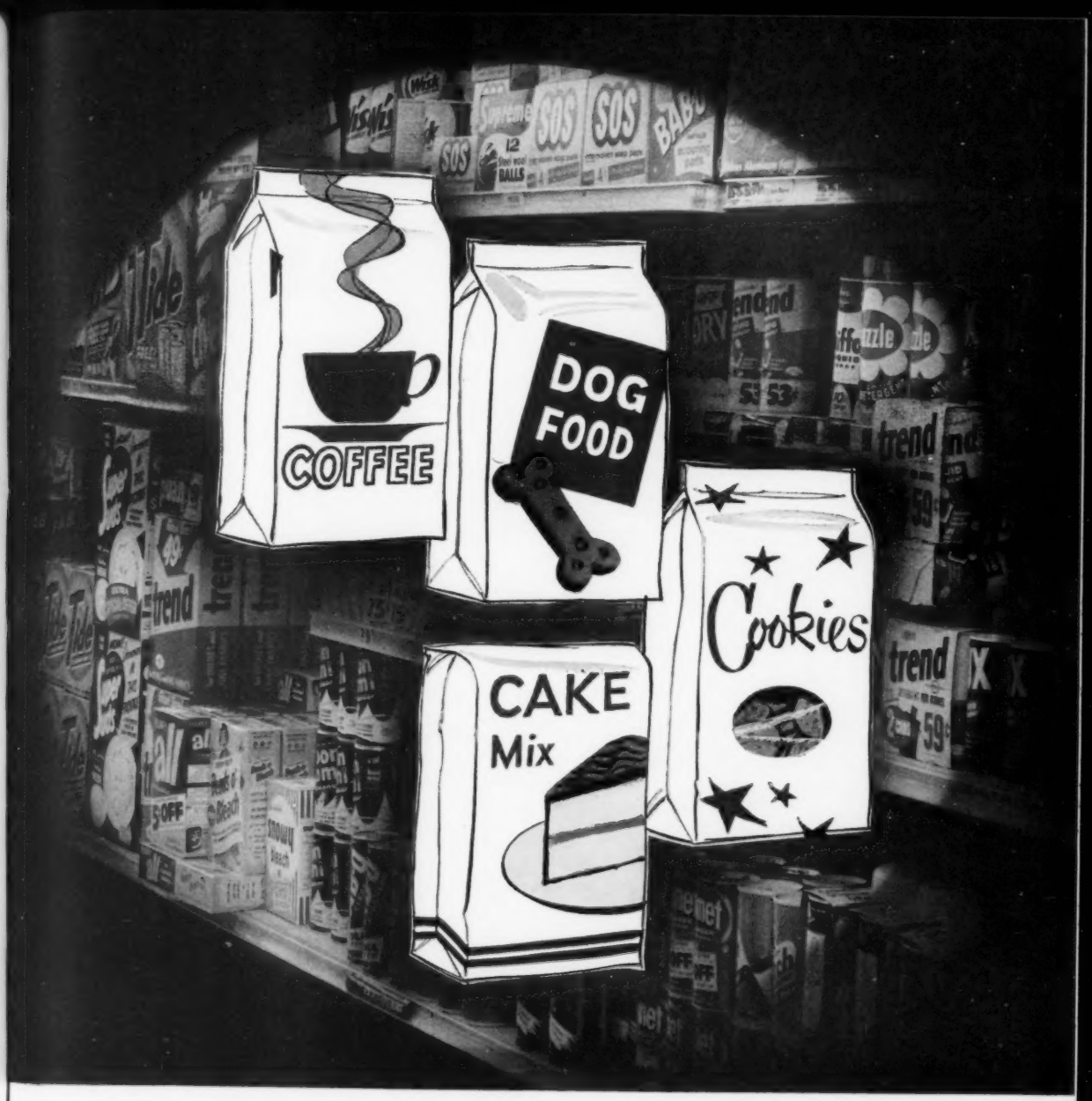
Intended use – Case sealing,
moisture resistant.
Meets spec.
MIL-A-101A.
For use on corrugated
containers.

Generally, an adhesive is introduced into a plant for one specific purpose. However, it has been my experience occasionally, that, a year or two later, this adhesive may come to be used for a number of other purposes. Although there is certainly nothing amiss with utilizing one adhesive for a number of different operations, it is obvious that this procedure at times evolves from a haphazard, hurried, plant selection.

An adhesive may thus be chosen because it is handy when a new gluing operation presents itself. The adhesive selected does not undergo the scrutiny of cost, performance requirements, or any of a host of other decisions entered into when selecting an adhesive properly. It is no longer a surprise to discover a plant consuming an adhesive that is two or three times the cost of the one actually needed to perform the operation. The operation may not require but a fraction of the premium qualities of an adhesive so selected. Therefore, it **is imperative that a clear cut statement of intended use be stated in the original adhesive specification.**

(Turn page)

Circle No. 248 on Card, Page 97



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3. Date Of Adoption

This position on the specification is needed to provide the necessary historical background on the adhesive. **It ties down the actual inception date and allows correlation with product manufacturing data.** In addition, this position may be used to designate dates of discontinuance and the circumstances surrounding the withdrawal. We might thus state this data as:

Date of adoption – June 15, 1957.
Discontinued April 30, 1959.
No longer need for moisture-resistant case sealing.

4. Machine Type

In adhesive technology, it is well established that the adhesive formulator must compound for particular application methods. Thus, if confronted with a machine that pumps the adhesive line, the adhesive chemist would select a far different product than the type needed for a stencil application.

The adhesive technologist is most likely familiar with the compression time characteristics of the machine and the operation. These and a variety of other factors enter into the selection of an adhesive for a packaging performance. **The chances are that nearly every packaging adhesive present in your plant was originally designed for a particular machine and operation.**

When the packaging engineer loses sight of this basic concept, he is likely to stray into a number of practical errors. For example, he may assume that, since an adhesive performs on one model of a manufacturer's case-sealing equipment, it will also perform on similar models. **Such a path of logic is lined with operational pitfalls.**

Therefore, it is advisable that we include under this heading whatever information is available on particular machines on which the adhesive performs best. This information might provide:

Machine types – Standard Knapp models #600, #429, #436.
Schroeder models #300, #300L.
Packomatic model #D.

Most adhesive suppliers maintain a fairly complete file on packaging machines and will be able to offer adhesive advice on new or revised machine introductions. The adhesive producer is frequently in contact with the machinery manufacturer during the design stages of new machinery production and should be in a position to make helpful recommendations and sensible submissions.

5. Adhesive Base

After the packaging engineer has been exposed to various adhesive polymers for some time, and with the identifying information supplied him by the adhesive manufacturer, he will have a general knowledge which will enable rough differentiation between adhesive polymers.

General experience, however, will not enable him to differentiate between a homopolymer of vinyl acetate and a copolymer of the same material. For this reason, he should call on the adhesive manufacturer to supply him with a rudimentary description of the base polymer employed in the adhesive. The base polymer may be described as:

Adhesive base – Polyvinyl alcohol.

Information on the base type of polymer is of vital importance to the packager. Each base polymer has properties substantially different from its counterparts. Familiarity with the base polymer allows the observer the opportunity to confirm the notions he may have as to flexibility, water and oil resistance, heat resistance, and so on, of the adhesive under examination.

Such knowledge also provides a broader base of understanding for the packager. It allows him to compare new sample submissions against standard grades and permits an intelligent discussion of the integral components of his package when reviewing the package for potential purchases.

This information may prove invaluable when considering the effects of accidental contamination by another adhesive in use within the plant. Identifying the adhesive will establish the compatibility characteristics of the various adhesives on hand. This data also permits adjustments to be made in the normal cleanup procedures.

6. Adhesive Solids

When utilized correctly, knowledge of the solids percentage of the adhesive becomes an important instrument of quality control. A reputable adhesive manufacturer can, and will, agree to control the solids range within reasonable limits. For most adhesives, this range of control can be within limits of two or three per cent. We might then state the solids specification as:

Adhesive solids – 39.0 to 41.0 per cent.

The user should look critically at the solids percentages of the adhesive he specifies. Low solids ratios are inconsistent with fast-set and good, nonwarp properties for most adhesives.

For optimum adhesion of packaging materials, it is desirable that the adhesive be deposited in the thinnest continuous film possible at the highest level of solids concentration consistent with the bond requirements. Adhesives which are over-diluted and then built back to normal viscosity tend to give poor bonds. These adhesives tend to lose the solvent phase of their system rapidly to the adherent substrates.

This rapid absorption does not allow proper orientation of the reactive end groups of the polymer to the adherent surface. These reactive side-chain and end-chain groups perform the bulk of the bonding process. Rapid absorption also tends to leave a discontinuous film at the interface, which drastically reduces bond strengths.

A high solids percentage in itself does not indicate an adhesive with high bond strengths. At times, a measurable percentage of the total solids may consist of clays, fillers, and other inert materials which contribute little to the total bond strength of adhesive. (*Turn page*)

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☐ Quote on enclosed sample. Quantity.....
☐ Quote on attached design. Quantity.....
☐ Have a technical representative call.

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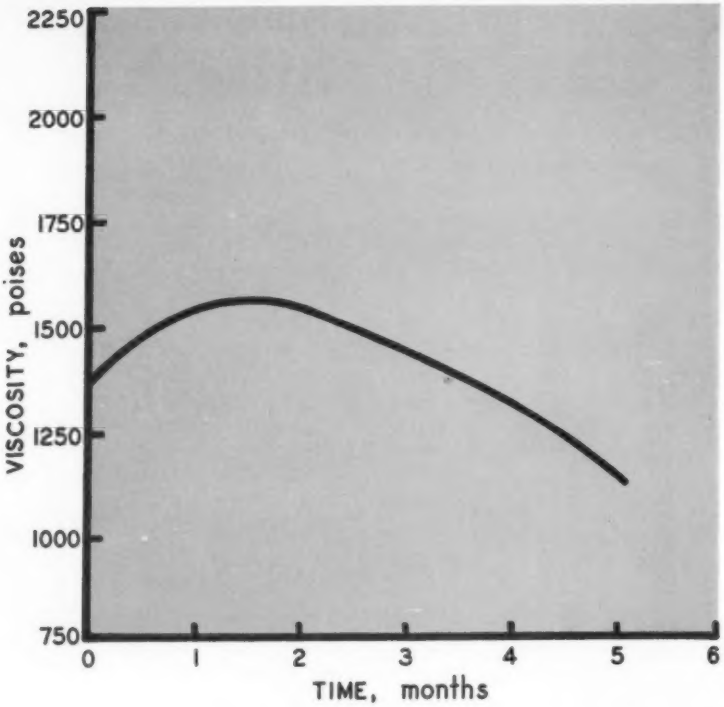
Company.....
Address.....



2 **EFFECT OF AGE ON VISCOSITY CHARACTERISTICS** of casein-based, foil-label adhesive. Note somewhat illogical development patterns likely to be encountered in packaging adhesives.

Observation of a cast film of adhesive will indicate these materials by the opacity they contribute to the otherwise translucent resin. In dextrine adhesives, an opacity in the wet adhesive, or a whitening or graying of the normal brown dextrine color, is usually an accurate indicator of the presence of inert extenders.

In checking the solids of the adhesive in your plant, there are two principle methods involved. One involves the use of a calibrated refractometer and is used only with non-emulsion type adhesives. This method usually demands the calibration of the instrument against known adhesive values. It is a quick and fairly accurate control test for use on starch- and dextrine-based packaging adhesives.

The second method, which can be employed for nearly all packaging adhesives, employs the time-honored, air-drying principle. Simply stated, this involves weighing into a tared evaporating dish (including cover) a small amount of adhesive. The dish is then air-dried in an oven until a constant weight is obtained. The dish is then removed from the oven, the top is affixed, and the dish is placed in a dessicator to cool. After cooling, the dish containing the dried sample is again weighed and the solids calibrated from the moisture loss in drying.

There are a number of variations in the above procedure. For example, some prefer to mix the adhesive with a predetermined dried quantity of sand. This technique allows greater surface area to be available for drying and eliminates the possibility of moisture vapor being trapped in the solidifying adhesive film.

If the user is in the practice of diluting adhesives prior to use, it will be well to use solids determination as one instrument of quality control. In most instances, the persons engaged in such a dilution task will continue to add water until they effect a workable viscosity. The difficulty with this procedure is that it does not allow for the adhesive which might be abnormally heavy but has met the specified solids range. Excess dilution, in this case, will result in an adhesive with an abnormally low solids ratio and increased possibilities for adhesive line failure.

7. Viscosity And Viscosity Characteristics

To the adhesive user, this portion of the specification can assume a life-or-death significance in evaluating adhesive performance. On many packaging machines, the only really effective control over glue line thickness is the relative viscosity of the adhesive. Viscosity is then a property through which the use exerts a control over application rates.

Experience with varying application and adhesive transfer methods will provide the packaging engineer with a fund of information regarding desired viscosity ranges. For many transfers, particularly those with inadequate metering arrangements, a difference of as little as 100 centipoises of viscosity may be enough to alter machine performance.

The adhesive manufacturer will provide a viscosity specification for the adhesive grade in question. In addition, however, it might be well for the adhesive user to familiarize himself with the general *viscosity behavior patterns* of his adhesives.

Adhesives are, for the most part, non-Newtonian liquids: Their flow properties may not be plotted by a mathematical extension of a single point on their stress-strain relationship graph. The viscosity of many of these liquids will alter as shear is applied to the system.

A few of these adhesives may also exhibit thixotropy, in that applied shear may reduce the viscosity temporarily, but with standing, and lack of agitation, the viscosity will return to its initial reading. Plotting stress against strain for these substances, will reveal a hysteresis loop characteristic of the functions encountered in thixotropy.

If we consider these adhesives

as colloidal systems altered by the addition of a variety of solvents, plasticizers, surfactants, and so on, we will be in a better position of understanding. We note that some adhesives thus thicken with aging, others thin out with time, others combine both these properties in a complex time-viscosity relationship. **Besides being aware of the initial viscosity of an adhesive, the observer should also familiarize himself with the rudiments of the subject adhesive's viscosity development pattern.**

It is well established, for example, that most dextrine adhesives exhibit some increase in viscosity on aging. This pattern is governed by the type of dextrine formula involved, the pH of the system, and the presence of retrograde additions to the formula. In contrast, in some latices, we might expect to witness a reduction in viscosity on aging. Some casein-based labeling adhesives will experience an early rise in viscosity only to slide back towards their original viscosity with aging.

Viscosity development pattern of a casein-based, foil-label adhesive is shown in Fig. 2. This graphic illustration is included to point up the somewhat illogical development patterns likely to be encountered in packaging adhesives. In Fig. 3, we may observe the same adhesive reacting to the stress of machine agitation in a labeling machine. The increase in viscosity in this instance is due to drying and air entrainment.

It is also important for the adhesive consumer to be acquainted with the viscosity characteristics of his adhesives under the influence of dilution. In Fig. 4, we have a graphic portrayal of the behavior of a typical borated dextrine, case-sealing adhesive under the influence of increasing additions of dilution water.

Taking into account these attributes of adhesive viscosity, it might be well then to state viscosity as:

Viscosity – 2500 ±500 centipoises.
(Brookfield, No. 3 Spindle
@ 20 r.p.m. and 80°F.)
Expected viscosity increase:
15 per cent max./60 days.

Note that, in this specification, the method and conditions of viscosity determination are included. Although the inclusion of such information may at first seem overly simple, these facts are of paramount importance. A comparison between competitive grades is virtually impossible without this information. **In discussing variances from adopted norms with your adhesive supplier, it is imperative that you both be talking of the same determination method for viscosity.**

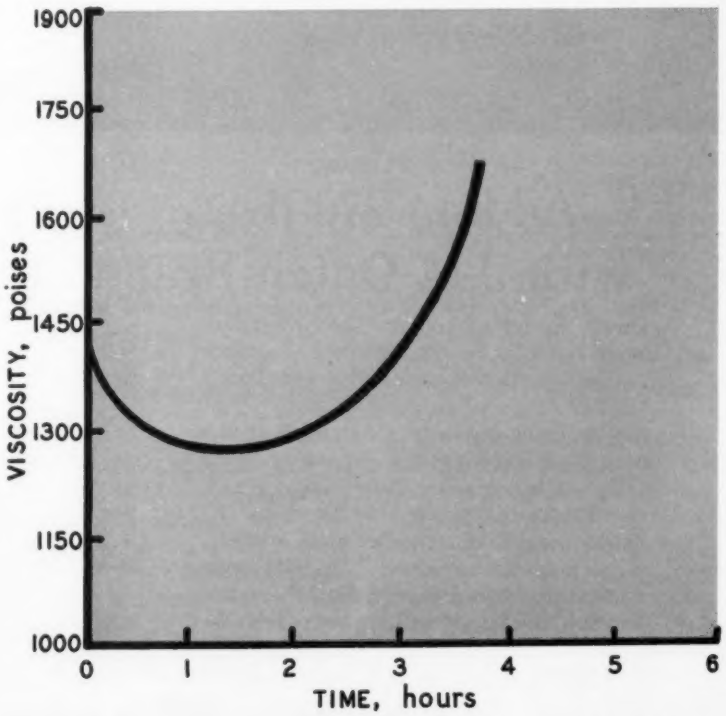
It is also advisable that, **wherever possible, all viscosity readings be in the same dimension,** that is, centipoises, Stormer seconds, MacMichael degrees, and so on. **Do not attempt to make a conversion from one viscometric rating to a radically different rating.** At certain points, correlations can be made between two variant methods, but, for all practical purposes, the packaging adhesive user would be better to refrain from such attempts.

8. Recommended Diluents

Although the writer does not generally favor the dilution of prepared packaging adhesives, there are circumstances where such a practice is unavoidable. This is particularly true when a single adhesive grade is being employed for a number of packaging operations.

For most packaging adhesives, the recommended diluent is simply water. There are, however, instances where toluol or slightly ammoniated solutions are better diluents. In adhesives utilizing solvent carrier systems, **it is well to adhere tightly to the manufacturer's recommendations on diluent solvents.** The addition of a random solvent to these systems is likely to produce partial insolubilization.

In the dilution of vegetable, as well as resinous, packaging adhesives, the user is safest by using room temperature dilution water. Occasionally, emulsion adhesives are deliberately destabilized in order to provide faster-breaking wet



3 **EFFECT OF APPLICATION MACHINE STRESS ON VISCOSITY** of casein-based, foil-label adhesive. Increase is due to drying and air entrainment. (No allowance made for paste replacement.)

Adding 270 lbs. of carton-strength with J-M Dutch Brand Strapping Tape

Dutch Brand Strapping Tape multiplies many times the weight a package can carry . . . keeps goods safe during shipment. Tough vinyl backing and strong glass strands give this strapping tape a tensile strength of 270 pounds per inch of width.

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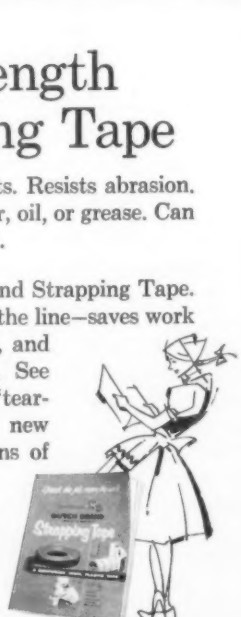
Investigate Dutch Brand Strapping Tape. See how it saves time on the line—saves work in packaging, palletizing, and bundling – saves money. See why it makes an ideal "tear-strip." Write today for new "idea book" giving dozens of profitable uses.



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films. The additions of dilution water at either extremes of the temperature range, to such destabilized systems, can at times produce local coagulation. The addition of diluent to a packaging adhesive should be followed by at least ten minutes agitation in order to insure a homogeneous mix. Pasty and high-viscosity adhesives may require further agitation to produce a complete dilution. Bearing the above in mind, we might proceed to the dilution specification as:

Recommended diluent –
Water, cold (50° to 70°F.).

All dilution of packaging adhesives must be done off the consuming machine, in a separate container. Without this fundamental practice, the packager is very likely to find himself plagued with a mysterious rash of adhesive problems as the machine operators promiscuously add diluent to the adhesives in the machine trays.

9. Recommended Solvents

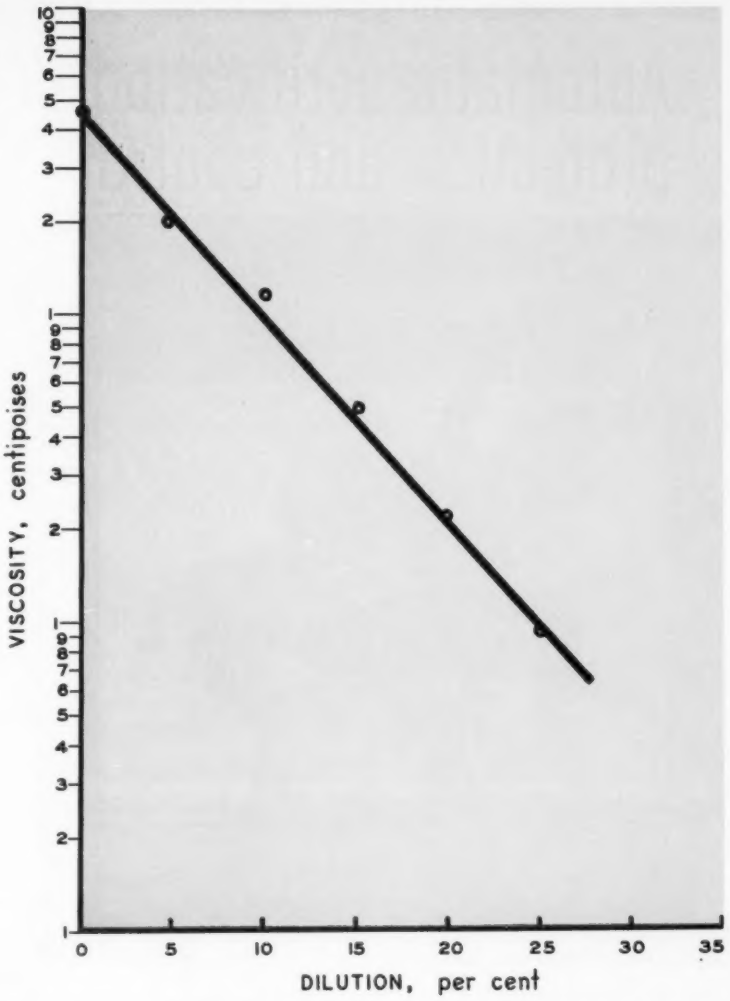
Invariably, in any adhesive operation, the packager is likely to find the problem of removing adhesive film from the machine surfaces a perplexing one. Solvents for dried film cleanup must be selected carefully. Some solvents, acting on the adhesive, produce only partial solubilization and, in fact, may tackify the film making it even more difficult to remove.

If at all possible, the packager should seek to soak the glue pots, applicator wheels, and so on, in a cleansing solution over a weekend in order to completely loosen any encrusted adhesive film. **The existence of dried adhesive deposits is extremely dangerous in that it may result in uneven transfer and bacterial contamination of the adhesive by dried remnants left in the machine tray.** Soaking in a mildly caustic cleaning solution does much to remove this dried film. For large machine parts, such as rolls and transfer bars, the alternate is to maintain a vigilant policy of cleanliness that allows a minimal build-up of adhesive film.

The specification for cleanup must then include some information as to procedure:

Recommended solvents –
Toluene or alkali cleaning solution. Soak for minimum of 8 hr. at room temperature.

Care should be taken that no traces of the cleansing agent remain in the adhesive tray after cleaning. Some cleaners, particularly those that are strongly alkaline, may destabilize any fresh adhesive added to the tray.



4 **INFLUENCE OF DILUTION ON VISCOSITY CHARACTERISTICS** of typical borated dextrine, case-sealing adhesives. (Diluent: water. This type data is important for adhesive user to have.)

10. Storage Life

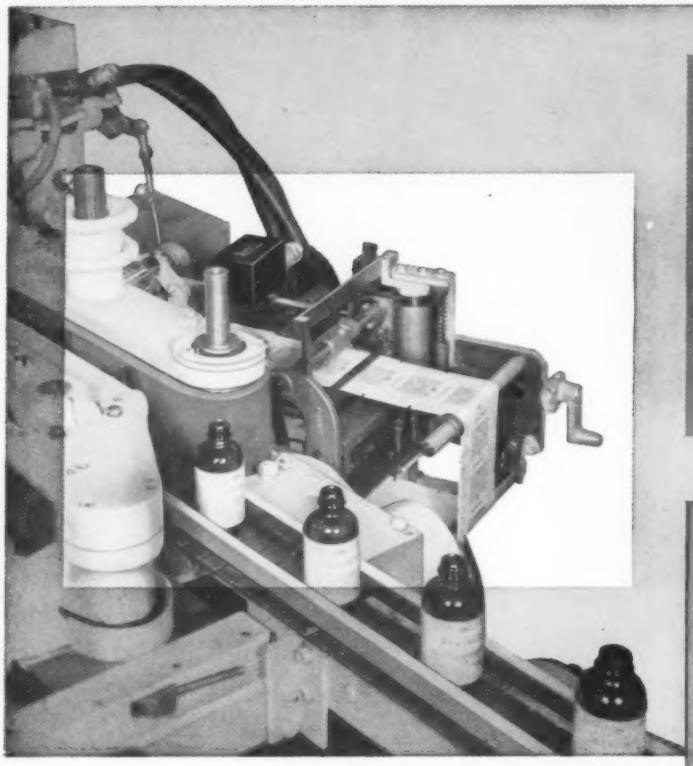
With few exceptions, packaging adhesives perform best when stored in a dry cool area. Upon receipt of a shipment, the material should be so arranged as to protect it from blasts of winter air or from exposure to excessive heat-producing equipment.

In addition, **each adhesive should have clearly written into its specification the maximum shelf life of the grade in question.** With proper inventory rotation, there will be no excuse for using overaged product. In this respect, the packaging engineer should familiarize himself with the shelf-life characteristics of the adhesives he is purchasing. Armed with but a few fundamental facts, the packaging engineer will

(*Continued on Page 112*)

New roll feed "no glue" labeling

Automatic verification, coding, protection and control



Shown here is the imprinting and coding head and electric eye controlled cut-off.

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For more information circle No. 251 on Reader Service Card, Page 97

Effect of packaging on palatability of frozen beef steak*

By James D. Winter,
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University of Minnesota,
St. Paul

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Union Carbide Plastics Company
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This study was undertaken to evaluate the effect on palatability and appearance of storing frozen beef steak in different combinations of sealed bags, unsealed wraps, and cartons with and without overwraps.

Materials of varying degrees of permeability to oxygen were selected for this purpose. All materials and combinations of materials used had relatively low permeability to water vapor. No weight records were taken because previous studies with various foods (*3, 4, 5, 7, 8*) have shown no appreciable change in weight occurs under similar experimental conditions when packaging materials of similar low permeability to water vapor were used. Therefore, only the observation of visual evidence of desiccation was included in the experimental plan.

Previous experiments at this station (*3, 6, 7, 8*) have shown that the palatability of frozen beef in storage may be significantly affected by the type of packaging material used. Similar results have been reported during recent years by various investigators such as McCoy, Cook, and Hayner (*1*) Simpson and Chang (*2*) and others. In almost all of these studies dealing with beef and pork, the lowest range of palatability scores has been associated with packaging materials having the higher rates of permeability to oxygen, except when the storage periods were too short or too long for differences to be found.

Materials And Methods

Selection and processing of beef. Two loins and two ribs from each of three carefully selected carcasses, grade U. S. choice, were obtained from a packer within five days after slaughter. The meat was then held for five days at 34°F. before being cut into steaks ⅝ to ¾ in. thick. The samples were cut and packaged on January 30, 1957.

Packaging materials. The following packaging materials were used for the lots indicated:

Lot	Packaging Material Identification
A, F, L	0.0015-in. aluminum locker foil, size 12x18 in. (reference samples).
B	Sealed bag, 0.004-in. polyethylene film extruded from Bakelite DFD-0100 resin of 0.922 density.
C	Item "B" as insert in Marathon No. 5 style Polyglaze paperboard carton 0.014 in., S.B. "Q" board coated with 0.001-in. Bakelite DFD-3200 polyethylene. Carton size: 1¼x8½x3 in.
D	Item "C" overwrapped with 30-lb. bleached sulphite paper coated one side with 0.001-in. low-density polyethylene, packaged with coated side outside.
E	Low-density polyethylene-coated carton with inner cellophane wrap (not sealed) and overwrap of aluminum foil-paper laminate (Swift and Co. carton).
G	Sealed bag, 300 MSAD cellophane extrusion-coated one side with 0.002-in. low-density polyethylene (Cheslam M3200), packaged with coated side inside.
H	Item "G" as insert in carton used for item "C".
J	Item "H" with overwrap used for item "D".
K	Sealed bag, 0.0015-in. polyethylene film extruded from Bakelite DFD-0210 intermediate-density (0.929) resin as insert in Marathon No. 5 style waxed carton, S.B. "Q" board coated with 0.014-in. high-gloss wax. Carton size: 1¼x8½x3 in.
M	Sealed bag, 0.001-in. Mylar polyester film coated on one side with 0.001-in. low-density polyethylene.
N	Sealed bag, 40-lb. super calendered bleached kraft paper coated one side with 0.001-in. low-density polyethylene.
P	Same as item "N" except air not evacuated before sealing.
Q	Sealed bag 0.0025-in. Scotchpak polyester film Type A.
R	Sealed double-walled bag, 0.0015-in. polyethylene film extruded from Bakelite DFD-0210 intermediate-density (0.929) resin, as used for item "K".

(*Turn page*)

*Paper No. 4182 of the Scientific Journal Series of the Minnesota Agricultural Experiment Station. This study was partially financed by a grant from Union Carbide Plastics Company, Division of Union Carbide Corporation.

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Packaging methods. Steaks were cut successively from the rib and loin portions of each carcass, working from the anterior to the posterior end, and were then placed in order on a clean table. Similar procedures were carried out for the right and left sides. One carcass was used for Lots A, B, C, D, and E; the second carcass for Lots F, G, H, J, and K; the third carcass for Lots L, M, N, P, and Q.

Steaks from the first carcass were assigned to lots as follows: the most anterior steak to Lot A, the second steak to Lot B, the third to Lot C, the fourth to Lot D, the fifth to Lot E, and sixth to Lot A, the seventh to Lot B, and so on, until each lot to be used for the first judging contained three steaks from the right side of the carcass. Each lot was then filled out in a similar manner with two steaks from the left side of the carcass. All these steaks were from the rib portion.

A similar procedure was used to fill out lots for the second judging period, with three steaks from the left side and two from the right side of the carcass—starting with the first available steak after those used previously. Thus, all steaks for the second judging period were from the middle area of the carcass. The same procedure was followed to fill out lots for the third judging period, all steaks being obtained from the loin or posterior portion.

Steaks from the two remaining carcasses were handled in the same manner. These procedures were followed to provide the greatest possible uniformity of material for the replications used in the experimental plan.

Packaging of all materials used

Low palatability scores on packaged frozen fresh meats after freezer storage have been associated with packaging materials having the higher rates of oxygen permeability, according to various investigators. This article reports experimental data resulting from a recent study of packaging materials having varying degrees of oxygen permeability rates.

Summary

▶ Two loins and two ribs from each of two carefully selected beef carcasses were packaged in 15 different packaging materials and stored up to 16 mos. at 0° F. (—17.8° C.) to —7° F. (—21.7° C.). Sealed bags alone, sealed bags and unsealed wraps as inserts in cartons, with and without overwraps, were used.

▶ All lots were judged for palatability at 8½ to 9 mos., 12 mos., and 15½ to 16 mos., and a statistical analysis of the data was made. The appearance of the samples was noted after thawing, just prior to cooking.

▶ Palatability scores indicated that the palatability of most of the samples remained relatively good for storage periods up to 12 mos., although significant differences among some of the various treatments were found. Only two lots had low palatability scores at the first judging period (8½ to 9 mos.). A sharp drop in palatability scores occurred during the 12- to 16-mo. storage period.

▶ During the three storage periods, significant differences were found among the palatability scores in 29 instances where packaging that differed in oxygen permeability was used. With only five exceptions, the permeability data indicated that the higher scores were associated with packaging materials having the lower rate of permeability to oxygen. Of the five exceptions, four involved intermediate-density polyethylene in comparison with materials of lower oxygen permeability, and one involved a significant difference at the 5 per cent level where the difference in palatability scores was not large.

▶ The customary darkening in color occurred during storage, with little difference among any of the lots and little, or no, evidence of desiccation.

in bag form was done on a Kenfield semi-automatic packaging machine which evacuates the excess air and heat-seals the bag in one operation.

The closures of cartons and overwraps, when used, were fastened with locker tape. The samples in aluminum foil were packaged by the customary "freezer wrap" method.

The work described here was conceived and undertaken prior to the passage of the Food Additives Amendment of 1958. It is not implied that all of the packaging materials used in this study will comply with current Food and Drug Administration regulations regarding food packaging materials. Data to support the use of most of these materials in food packaging applications are being accumulated.

Oxygen permeability of packaging materials. The permeability data on the packaging materials used are shown in Table I.

Freezing and storage. The samples were frozen and stored in a low temperature room operating at 0°F. (−17.8°3.) to −7°F. (−21.7°C.). They were placed one layer deep during the freezing period. To provide uniform storage conditions, wooden blocks measuring ½ x1¾x11 in. were placed at the ends of 11x17-inch aluminum trays. The frozen samples were then placed on the trays approximately 1 in. apart. The trays were stacked to a height of about 9 in., including an empty aluminum tray on the top and bottom of each stack. Each stack of trays contained four replicates of the series.

Evaluation of appearance. The samples were observed at each judging period after thawing and prior to cooking to determine whether there was evidence of undesirable changes in appearance.

Cooking. The wrapped samples were thawed in front of a fan at room temperature in their original wrappings. They then were unwrapped and broiled in a single-oven electric range under uniform cooking conditions. A numbered aluminum tag was inserted in the

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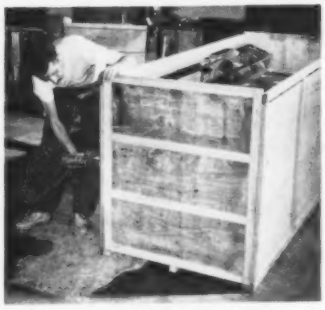

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TABLE I
Oxygen Permeability Of Packaging Materials*

Packaging Material	Code For Lots Where Used	Number Of Samples Tested	Material Thickness (in.)	Permeability, Moist O_2†
Low-density polyethylene film, 0.004 in. thick	B, C, D	4	0.0032 to 0.0049	64.3 to 108.3
Paperboard carton, polyethylene-coated	C, D, H, J	4	0.0147	198.2 to 290.2
Polyethylene-coated paper	D	2	0.0034 to 0.0035	109.5 to 215.5
Cellophane innerwrap	E	4	0.0010 to 0.0011	1.48 to 5.44
Paperboard carton	E	2	0.0178	‡
Foil-paper laminate	E	4	0.0040 to 0.0043	0.74 to 1.8
Polyethylene-coated cellophane	G	4	0.0029 to 0.0030	10.99 to 18.0
Intermediate-density polyethylene film, 0.0015 in. thick	K	4	0.0015 to 0.0018	223 to 232
Paperboard carton, wax-coated	K	2	0.0167 to 0.0168	‡
Polyethylene-coated Mylar film	M	4	0.0021 to 0.0022	1.18 to 3.62
Polyethylene-coated kraft	N, P	2	0.0039 to 0.0041	194 to 208
Scotchpak polyester film	Q	2	0.0025 to 0.0024	6.04 to 6.49
Double-walled bag, intermediate-density polyethylene, 0.0015 in.	R	4	0.0015 to 0.0018	223 to 232 §

*Supplied by Packaging Division Laboratories of Union Carbide Plastics Co.
†cc/24/hr./100 sq. in., @ 23°C. (73.4°F.).
‡Did not hold vacuum — probably due to failure of clamping device.
§Permeability of each component wall, as determined for item "K."

top of each sample for code identication purposes.

Taste panel. Only the eye muscle, which runs through both loin and rib, was used for sampling. A reference sample was used at each judging, consisting of a sample from the same carcass stored at the same temperature. The panel agreed on an acceptable score for the reference sample, then individually scored the remaining coded samples. This technique provided the judges with a uniform basis of comparison at each judging period. The maximum number of samples judged at one time was five, in addition to the reference sample.

A scoring range of 1 to 10 was used, with 10 the optimum. Each judge was instructed that a score of 7 or higher should be used to indicate a rating of good or better, and that a score of 4 or lower should be used to indicate an unacceptable rating.

Analysis of data. Four replicate samples were used for each treatment and storage period. A statistical analysis was made of the taste panel scores to determine the signicance of differences except for the reference samples which were not scored individually.

Results

The palatability scores for samples from each of the three beef carcasses used are shown in Tables II, III and IV. The customary darkening in color occurred during storage, with little difference among any of the lots and little or no visible evidence of desiccation (freezer burn).

Carcass No. 1. The scores as shown in Table II indicated that the palatability of all lots remained relatively good for the first 12 mo. A sharp drop in the palatability scores occurred in all samples during the 12- to 15½-mo. storage period.

The following palatability scores were signicantly different, in each instance the higher of the paired scores being shown first:

Lots C and B, 8½ mo., at 1 per cent level
Lots C and B, 12 mo., at 5 per cent level
Lots C and D, 8½ mo., at 5 per cent level
Lots E and B, 8½ mo., at 1 per cent level
Lots E and D, 8½ mo., at 5 per cent level

The differences in these scores were relatively large at the 8½-mo.

storage period with the exception of the difference between Lots C and D. **In each paired comparison, except with Lots C and D, the permeability data indicated that the higher scores were associated with packaging having the lower rate of permeability to oxygen.** The carton overwrap used for Lot E had the lowest permeability to oxygen of all materials used except that used for the reference samples.

The significant differences between Lots C and B at 8½ and 12 mo. indicated that the carton used provided some additional protection to the stored product.

Carcass No. 2. The lowest average score during the first 12 mo. was 6.73 (Table III), indicating that the palatability of all lots remained relatively good during this period. As with Carcass No. 1, a sharp drop in the palatability scores occurred in all samples during the 12- to 15½-mo. storage period.

The following palatability scores were signicantly different, in each instance the higher of the paired scores being shown first:

Lots H and G, 12 mo., at 5 per cent level
Lots J and G, 8½ mo., at 1 per cent level
Lots J and H, 8½ mo., at 1 per cent level
Lots K and G, 8½ and 12 mo., at 5 per cent level
Lots K and G, 15½ mo., at 1 per cent level
Lots K and H, 8½ mo., at 5 per cent level
Lots K and H, 15½ mo., at 1 per cent level

The difference in the palatability scores between Lots H and G at 12 mo., although small, indicated that the carton used provided some protection to the stored product. The differences in the scores at 8½ mo. between Lot J and Lots G and H were large, indicating that the overwrapped carton provided some additional protection to the stored product. **The permeability data also indicate that these higher scores were associated with packaging having the lower rate of permeability to oxygen.**

On the other hand, the consistently higher scores for Lot K, as

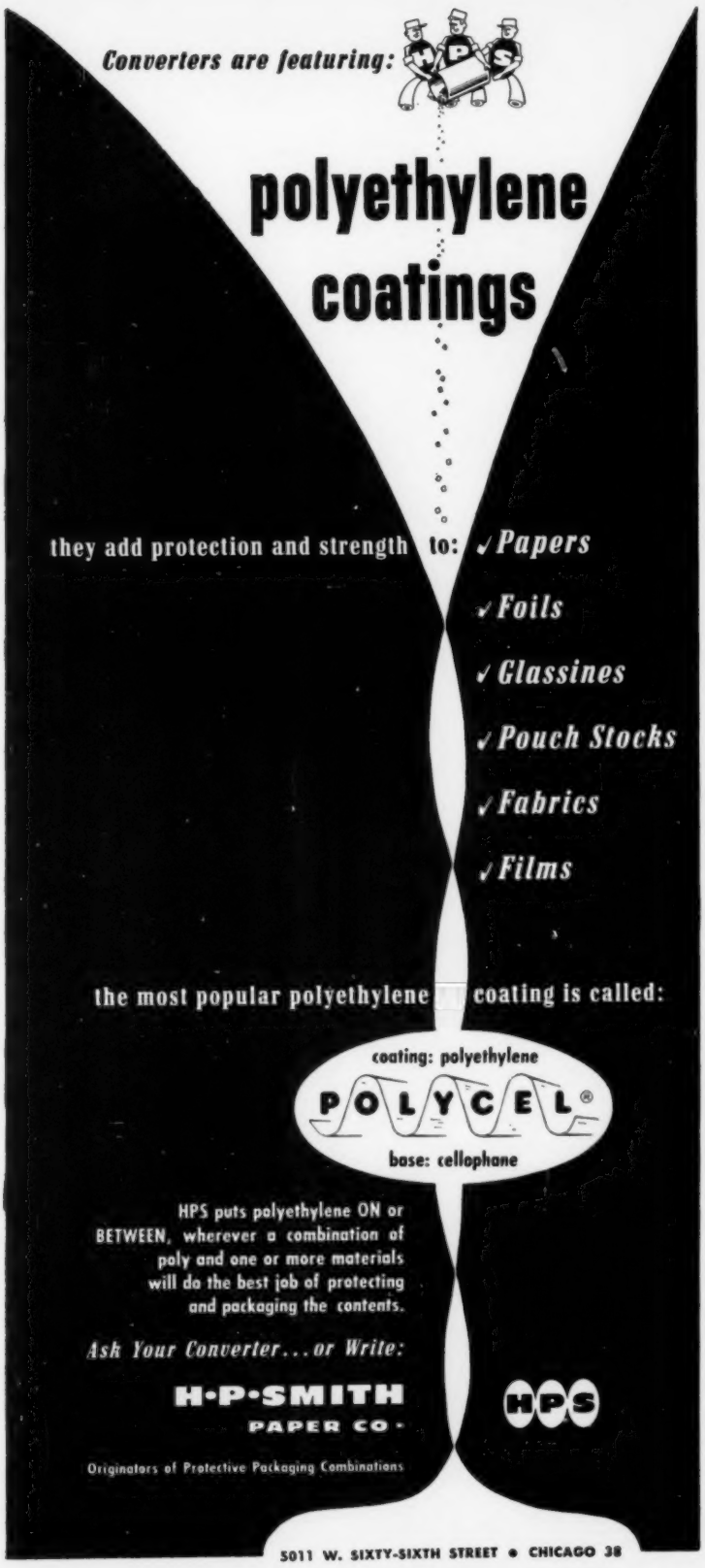
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TABLE II

Palatability Scores Of Frozen Beef Steaks From Carcass No. 1, Stored In Various Packaging Materials At 0° F. (—17.8° C.) To —7° F. (—21.7° C.)

Lot	Packaging Material Description*	Storage Period (mo.)	Palatability Scores† (avg.)
B.....	Sealed low-density polyethylene bag, 0.004 in.	8½	6.40
		12	7.03
		15½	5.36
C.....	Polyethylene-coated carton with sealed bag (B) insert	8½	7.44
		12	7.63
		15½	5.82
D.....	Carton with sealed bag (B, C) insert, and overwrap, polyethylene-coated paper	8½	6.69
		12	7.58
		15½	5.47
E.....	Carton with inner unsealed cellophane wrap, and laminated overwrap	8½	7.60
		12	7.26
		15½	5.58
A.....	Reference sample, aluminum foil 0.0015 in., freezer wrap	8½	8.00
		12	7.75
		15½	6.00

	@ 0.05	@ 0.01
L.S.D. between packaging materials, 8½ mo.	0.712	0.966
L.S.D. between packaging materials, 12 mo.	0.598	0.811
L.S.D. between packaging materials, 15½ mo.	0.682	0.925

*Complete description will be found in the text under "packaging materials."
†Scoring range 1 to 10, with 10 the optimum. A score of approximately 7.0 indicates a rating of good or better. Score of the sample stored for 1 mo. at 0° F. (—17.8° C.) to —7° F. (—21.7° C.) was 8.86.

compared with Lots G and H at all but one of the judging periods, do not indicate the same association between oxygen permeability and palatability scores. The intermediate-density polyethylene used for Lot K has a higher rate of oxygen permeability than the polyethylene-coated cellophane used for Lots G and H.

Carcass No. 3. The scores as shown in Table IV indicated that the palatability of Lots N and P were relatively low after storage for 9 mo. The scores of the other samples after the 9- and 12-mo. storage periods indicated that their palatability remained relatively good. As with carcasses Nos. 1 and 2, a sharp drop in the palatability scores occurred in all samples during the 12- to 16-mo. storage period.

The following scores were significantly different, in each instance the higher of the paired scores being shown first:

Lots M and N, 9 mo., at 1 per cent level
Lots M and N, 12 and 16 mo., at 5 per cent level
Lots M and P, 9, 12, and 16 mo., at 1 per cent level
Lots M and R, 16 mo., at 1 per cent level
Lots N and P, 16 mo., at 1 per cent level
Lots Q and N, 9 mo., at 5 per cent level
Lots Q and P, 9, 12, and 16 mo., at 1 per cent level
Lots Q and R, 16 mo., at 5 per cent level
Lots R and N, 9 mo., at 5 per cent level
Lots R and P, 9 and 12 mo., at 5 per cent level
Lots R and P, 16 mo., at 1 per cent level

The films used for Lots M and Q were much lower in permeability to oxygen than the packaging materials used for Lots N, P, and R. **There were no significant differences between the palatability scores for Lots M and Q.** The packaging films used for Lots M and Q differed only slightly in permeability to oxygen.

The same packaging material was used for Lots N and P. **The palatability scores for the samples from which air was not evacuated prior to sealing (Lot P) were significantly lower after 16 mo. storage than those for samples from which the air had been evacuated.**

In each other instance where significant differences in palatability scores were found, the higher scores were associated with packaging having the lower rate of permeability to oxygen.

Discussion

The palatability of almost all the samples was relatively good for storage periods up to 12 mo. at

TABLE III

Palatability Scores Of Frozen Beef Steaks From Carcass No. 2 Stored In Various Packaging Materials At 0°F. (—17.8° C.) To —7° F. (—21.7° C.)

Lot	Packaging Material Description*	Storage Period (mo.)	Palatability Scores† (avg.)
G.....	Sealed bag, polyethylene-coated cellophane	8½	6.73
		12	7.25
		15½	5.21
H.....	Polyethylene-coated carton with sealed bag (G) insert	8½	6.76
		12	7.79
		15½	5.25
J.....	Carton with sealed bag (G, H) insert, and overwrap polyethylene-coated paper	8½	7.88
		12	7.76
		15½	5.67
K.....	Wax-coated carton, with sealed bag insert of intermediate-density polyethylene	8½	7.51
		12	7.81
		15½	6.17
F.....	Reference sample, aluminum foil 0.0015 in., freezer wrap	8½	7.00
		12	7.50
		15½	5.75

	@ 0.05	@ 0.01
L.S.D. between packaging materials, 8½ mo.	0.595	0.807
L.S.D. between packaging materials, 12 mo.	0.512	0.694
L.S.D. between packaging materials, 15½ mo.	0.546	0.741

*Complete description will be found in the text under "packaging materials."
†Scoring range 1 to 10, with 10 the optimum. A score of approximately 7.0 indicates a rating of good or better. Score of the sample stored for 1 mo. at 0° F. (—17.8° C.) to —7° F. (—21.7° C.) was 9.29.

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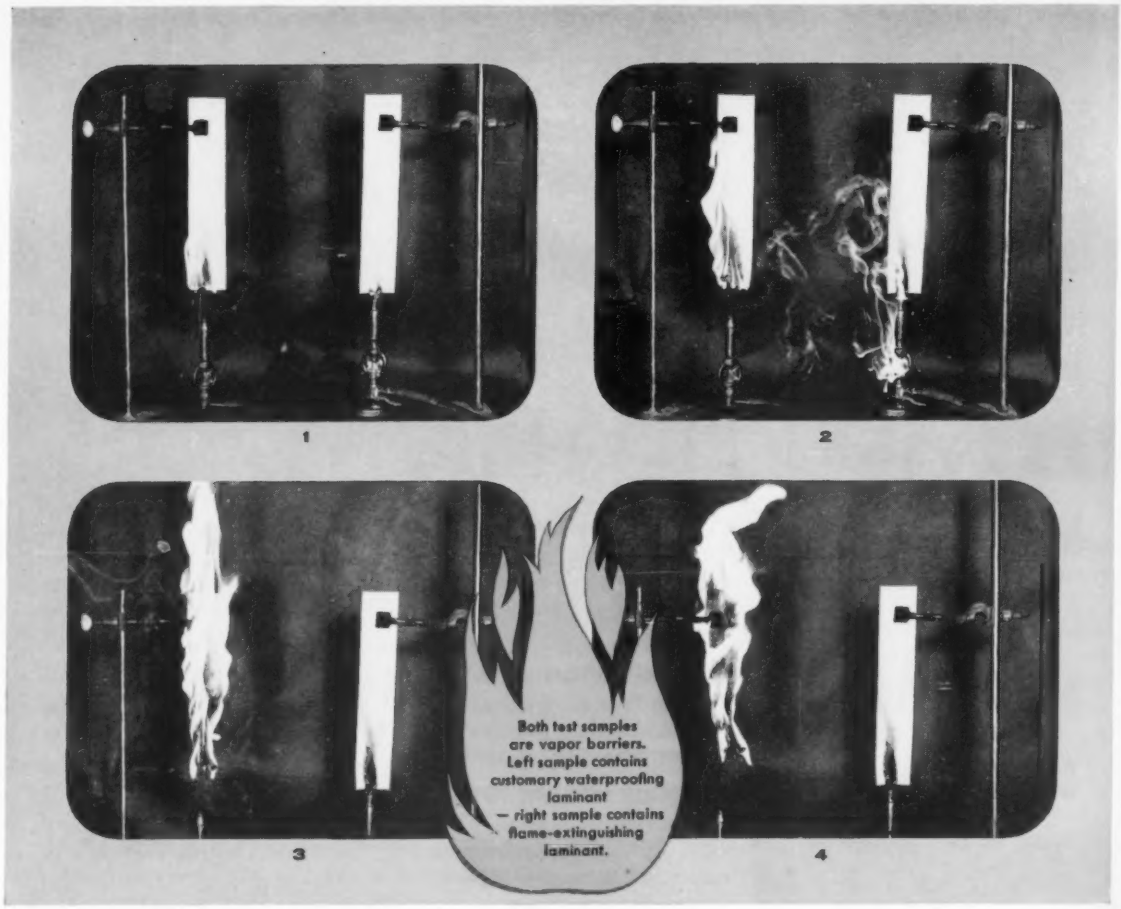
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TABLE IV

Palatability Scores Of Frozen Beef Steaks From Carcass No. 3 Stored In Various Packaging Materials At 0° F. (—17.8° C.) To —7° F. (—21.7° C.)

Lot	Packaging Material Description*	Storage Period (mo.)	Palatability Scores† (avg.)
M.....	Sealed bag, Mylar film coated with polyethylene	9	7.11
		12	7.78
		16	5.67
N.....	Sealed Bag, polyethylene-coated kraft paper	9	5.86
		12	7.06
		16	5.13
P.....	Same as Lot N except air not evacuated before sealing	9	5.71
		12	6.56
		16	3.71
Q.....	Sealed bag, Scotchpak film	9	6.75
		12	7.41
		16	5.54
R.....	Sealed, double-walled bag, intermediate-density polyethylene	9	6.61
		12	7.33
		16	4.88
L.....	Reference sample, aluminum foil 0.0015 in., freezer wrap	9	6.50
		12	8.00
		16	5.78

	@ 0.05	@ 0.01
L.S.D. between packaging materials, 9 mo.	0.730	0.990
L.S.D. between packaging materials, 12 mo.	0.592	0.803
L.S.D. between packaging materials, 16 mo.	0.525	0.712

*Complete description will be found in the text under "packaging materials."
†Scoring range 1 to 10, with 10 the optimum. A score of approximately 7.0 indicates a rating of good or better. Score of the sample stored for 1 mo. at 0° F. (—17.8° C.) to —7° F. (—21.7° C.) was 8.57.

James D. Winter received his B.S. and M.S. degrees from the University of Minnesota, where he is now associate professor, department of horticulture. In 1957 he received the achievement award from the National Institute of Locker and Freezer Provisioners, of which he is an honorary member. Mr. Winter is a member of Gamma Sigma Delta, Sigma Xi, and a charter member of Phi Tau Sigma. A member of Institute of Food Technologists, he has authored a number of technical papers on packaging of frozen foods.

Shirley R. Trantanella was graduated with B.S. and M.S. degrees in home economics from the University of Minnesota where she is now an instructor, department of horticulture. She is a member of Phi Upsilon Omicron, Sigma Delta Epsilon, and Mortar Board. Miss Trantanella also holds membership in American Home Economics Association and the Minnesota section of Institute of Food Technologists.

W. J. Aunan holds B.S., M.S. and Ph.D. degrees from the University of Minnesota where he is associate professor in charge of meats, teaching and research, department of animal husbandry. In 1957 he received the F. C. Vibrans senior scientist award of the American Meat Institute Foundation. Dr. Aunan is a member of Sigma Xi, American Association for the Advancement of Science, Society of Animal Production, and Reciprocal Meats Conference.

Watson B. Ackart received his B.S., M.S. and Ph.D. degrees in bacteriology from Rutgers University. After six years with the research and development division of Merck & Company, Inc., he joined Union Carbide Plastics Company and is currently a development associate in the packaging division of the development department. Dr. Ackart is a member of Sigma Xi, Society of American Bacteriologists, and Institute of Food Technologists.

0°F. (−17.8°C.) to −7°F. (−21.7°C.). Only two lots (N and P) had low palatability scores at the first judging period. Both these lots were stored in packaging material of relatively high oxygen permeability. However, significant differences in palatability scores were found among some samples stored in the remaining packaging materials at certain storage periods.

With several exceptions, whenever there were significant differences among scores, the higher scores were associated with packaging materials having the lower rate of permeability to oxygen. One of these exceptions (Lots C and D) involved a significant difference at the 5 per cent level where the difference in scores was not large. The other exceptions involved the scores for samples sealed in intermediate-density polyethylene (Lot K) which were consistently higher than those of samples (Lots G and H) where packaging of lower oxygen permeability was used. The reason for this apparent inconsistency is not clear.

The semi-automatic packaging machine, used for all materials in bag form, produced an effective heat seal in all instances.

These studies should not be interpreted as a warranty for the use of the packaging materials described. Similarly, no implications should be made regarding the use of these materials for food packaging applications under the Food Additives Amendment of 1958 inasmuch as experimental evidence required under the regulations is not yet available in every instance.

Acknowledgements

The authors are indebted to Mrs. Marlys L. Anderson, Mr. Edward Haeg, and Mr. Oliver Hagen for assisting in the processing operation and in the taste panel appraisals. Thanks also are due Mr. Milo O. Peterson and Dr. Charles Gates for making the statistical analysis. The cooperation of Mr. R. S. Leslie and Mr. William Barbush for providing packaging facilities was greatly appreciated. The authors also wish to acknowledge the generous donations of packaging materials made by the Marathon Corporation, Swift and Company, and Lowe Paper Co. *(Continued on Page 104)*

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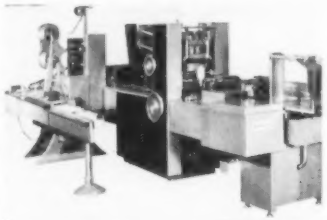
Scandia Packaging Machinery Co. announces its newly developed Model 401 "Pocket-Packer" which



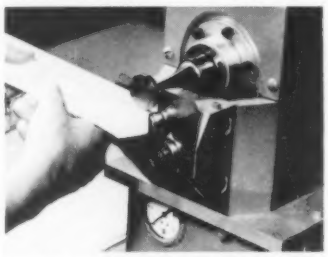
performs functions of cigar loading, carton forming (forms blank around cigars as they move through machine) and gluing, package closure and sealing, and cellophane overwrapping with opening tape. Cigars are fed from one of two magazines, the other serving as a reserve. Feeler "fingers" at bottom of each magazine automatically detect presence or absence of cigars in magazine; if absence, they switch to reserve. Both magazines are electrically interlocked. Five cigars at a time are inserted into individual, U-shaped, stainless steel mandrels mounted on endless conveyor chain which travels length of machine. Machine features "position printing" of fast-setting adhesive as each carton blank is fed into position. Main adhesive reservoir feeds two small fountains with rollers to keep the adhesive in constant agitation. As the mandrel containing the five cigars moves horizontally into vertically-positioned carton blank, blank is progressively folded around it. Continuing pressure assures firm bond of glued portions of carton. Circle No. 1.

Electronic Container Tester

Gaynes Engineering Co. has developed a new electronic container tester, #CT10-446, for compression and tension testing, requiring no springs, balance beams or counterweights. Electronic weighing and recording is done with load cell system mounted to bottom platen and supported by heavy cross beams of frame. This is connected to electronic recorder, and as force is exerted in compression or tension, moving pointer on recorder indicates exact force applied. This is visibly noted, and at same time, writing pen makes permanent record showing pressure versus deflection curve on synchronized chart which is travelling at same speed as moving platen. Tester has mobile master control console, capacity of 4x4x6 ft. and 0 to 10,000 lb. range. Circle No. 2.

Ultrasonic Seam Welding

Aluminum Co. of America announces high speed ultrasonic seam welding of aluminum for



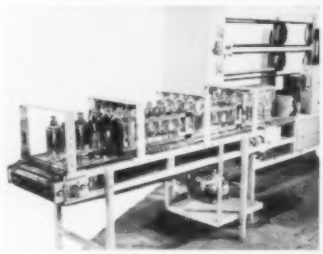
container and packaging manufacture with Aeroprojects Inc.'s "Sonoweld" machine. It utilizes ultrasonics for seam welding light gauge sheet and foil in thicknesses ranging from 0.006 to 0.010 in. at speeds over 30 ft./min. Speeds over 100 ft./min. have been repeatedly demonstrated using ultrasonic seam welding in somewhat thinner materials. Ultrasonic seam welds can be stopped and started abruptly, and they establish leak tight weld seams, even by helium leak standards. Circle No. 3.

Carton Stapler

Container Stapling Corp. has available Model HD "Clip-Top" packer that closes any ordinary filled cartons from outside with king-size staple clips (3 or 4 for average carton). Also sets-up empty containers for packing. The new adjustable anvil staples A-, B-, or C-flute corrugated board. Twist of adjustor screw automatically controls staple clip for flute thickness. Circle No. 4.

Case Packing And Sealing Machine

Thiele Engineering Co. has developed a combination case packer and sealer that requires only



4x12 ft. of floor space and handles cartons, round tin cans, glass bottles or jars. Incorporating this unit with Thiele's standard semi-automatic case packer reduces floor space requirement to about ¼ of that needed for separate machines. Units are delivered by input conveyor to assembly table for automatic grouping in 12's or 24's. When table is full, metal stops cut off flow of more units and metal line guides retract to make way for dividers. Operator then slips set-up shipping case over case load and slides it onto case assembly line. Machine completes folding, gluing and compression. Unit can be built to handle cases open at top and bottom or top-sealed reshipper cases. Speed is regulated automatically and arranges for packing from 5 to 15 cases/min. Circle No. 5.

Bottle Packer

Emhart Manufacturing Co., Portland Div., has developed a new Standard-Knapp automatic bottle packer designed to deliver up to 40 per cent more capacity in 27 per cent less space. The S-K 860 is of structurally formed sheet steel and is adjustable to different sizes of bottles and patterns of

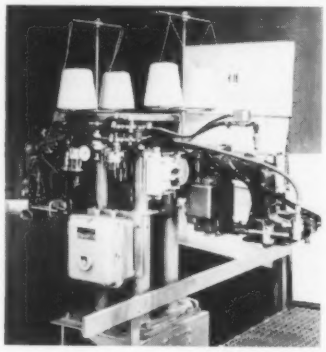
pack. It loads full or half-depth cases with or without partitions or carry-home cartons, permits one-man changeover, and incorporates a simplified grid and fewer moving parts. Other features—self-aligning bearings, air-operated pusher plates which replace cams, and self-contained drive. Circle No. 6.

Polyethylene/Wax Paper Adhesive

Java Latex & Chemical Corp. announces the development of "Javatex," an adhesive for polyethylene and wax paper. Available in different viscosities (from 100 to 20,000 centipoise) for side and bottom seams, "Javatex" will not bond polyethylene to itself. It can be applied by machine or spray. Its manufacturer says it is permanently flexible, shock resistant, can withstand extremes in temperature, is non-inflammable, will permanently adhere labels to polyethylene containers, and dries transparent without any residual odor. Circle No. 7.

Dual Head Sewing Stand

Union Bag-Camp Paper Corp. reports an addition to its packaging machinery line—a dual head sewing stand for closing open-mouth multiwall bags. It accommodates the 80600E or 80600H sewing head. Advantages of dual head are: If one sewing head breaks down, other one can be swung into place without loss of production; this is done by removing a pin on sewing stand, swinging pedestal 180° and replacing pin. If both plain sewn closure and bound-over tape closure are used on same production line, one position of stand can be used for the "E" and other for "H" head; thus eliminating necessity of changing heads. Circle No. 8.

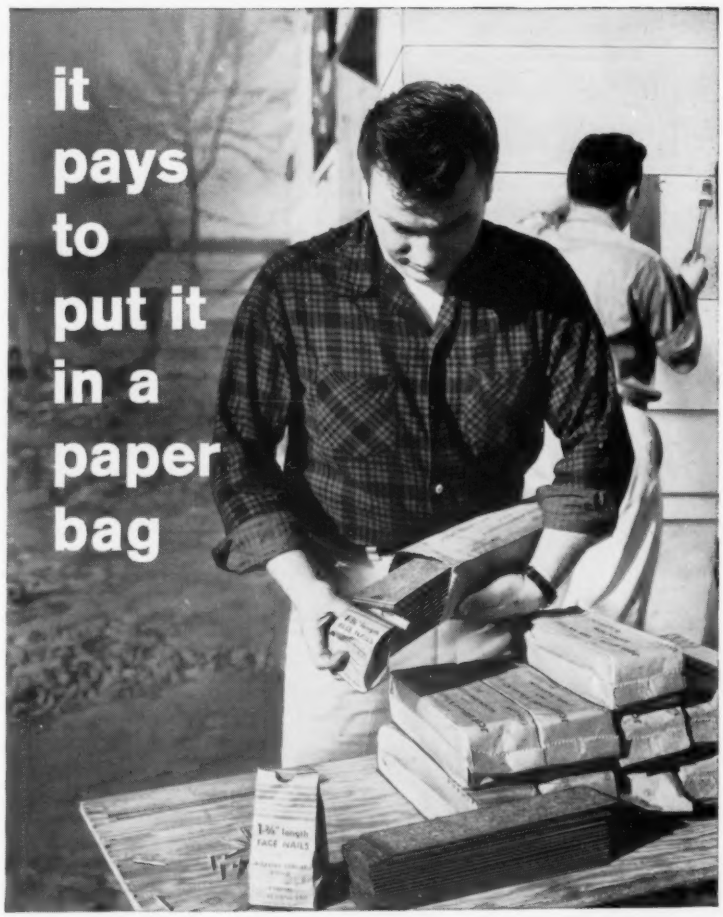


Saran-Coated Tubes And Cores

J. C. Baxter Co. is now supplying spiral-wound tubes and cores with an outer coating of Saran for a

when you package a product for

FIELD ASSEMBLY



Paper bags keep related field-assembly items in place—eliminate errors. They save you and your customers time and labor. They protect your product.

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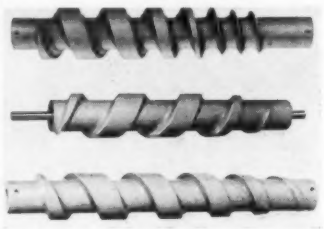
water-proof exterior. They can be produced in various colors or with clear coating over a printed surface and are manufactured cut to length in diameters up to 36 in. Baxter says these Saran-coated tubes and cores are capable of withstanding heat up to 250°. Circle No. 9.

Timing Screw

Arthur Colton Co. has announced the availability of a new custom timing screw that will accurately



feed round, oval, square or rectangular glass bottles, metal cans or plastic containers on a variety of packaging machines. The "Kinsley Timing Screw" will pick up containers from a conveyor at random, move them under controlled acceleration and speed and discharge each container at required spacing for packaging operation. Each timing screw is generated to fit a specific container or range of container diameters. Screw form is made to match that of specific container it will move, as well as machine pitch requirements. Two-point contact can be maintained if necessary between screw and container. Screw is made of nonmarking, long-wearing, resin-impregnated linen or cellulose material, and is driven by normal power takeoff from packaging machine to assure synchronization. Circle No. 10.

Bottle Uncaser

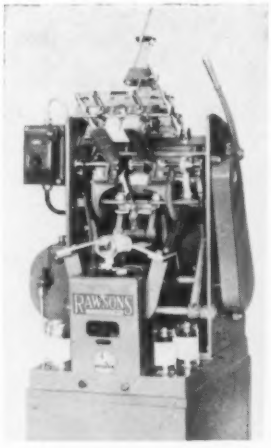
Atkron, Inc. announces a new, wide head adaptation of the "Atkron Dumore" universal uncaser, to handle bottles in 5 and 6 wide cases. Working principles are same as standard model, but new head permits spacing fingers to accommodate 4 wide cases with bottle centers up to 4 3/16 in.; 5 wide cases with bottle centers up to 3 1/8 in.; and 6 wide cases with bottle centers up to 2 1/2 in. Uncaser consists of two simple rotating conveyors; (1) finger assembly belt-chain which carries fingers around hardened cams, causing them to open and close as necessary; (2) pusher bar chain which controls the cases throughout entire uncasing operation. All standard and most nonstandard cases can be handled and complete changeover for different bottles and cases can be done in 15 min. or less. Capable of speeds up to 40 cases/min. Circle No. 11.

Stronger Corrugated Board

Owens-Illinois Glass Co. reports the perfection of a new, stronger type of C-flute corrugated board. Called O-I C-flute, it has up to 17 per cent greater resistance to flat crush than ordinary C-flute through a change in design of the flute contour. Its "contour engineered" design yields an actual Concora Medium Tester reading of 56.91 lb./sq. in. against 48.58 lb./sq. in. for conventional C-flute. Because board is more rigid, it offers an improved printing surface and more positive folding during automatic assembly operations. Circle No. 12.

High Speed Labeler

Potdevin Machine Co. announces the availability of the English-made "Autorex" high speed label-



er, a new semiautomatic machine particularly adaptable to irregularly shaped, normally difficult-to-label bottles, vials, collapsible tubes, tool handles, paper packets and aerosols. The adhesive model is capable of labeling speeds of from 1,200 to 2,000 labels/hr. Also produced in heat-seal models. Circle No. 13.

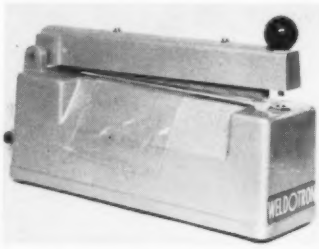
Vibrator Table

National Air Vibrator Co. has a new pneumatic vibrator table, Model RV2th, for use in packaging. To get the required amount of vibration for settling, packaging, shock or fatigue testing, the operator just changes the air pressure which changes the vibration frequency. Of one-piece construction, it has a 25x28-in. table and overall height (including top-

mounted vibrator) of 6 ft. Automatic lubricator, pressure regulator with gage, and knee-, foot-, or hand-lever valve are included. Circle No. 14.

Polyethylene Sealer

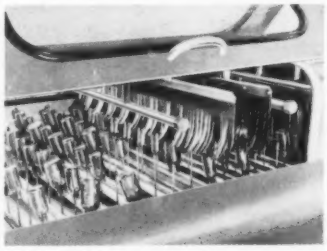
Plastic Welding Corp. reports the development of its "Weldotron Sealboy" polyethylene sealer. De-



signed primarily for sealing small polyethylene bags, it will also seal up to and including 8-ft. lengths of other films. Unit is 12½x4 in., and sealing time runs from ½ to 2 sec., depending on thickness of packaging film. Circle No. 15.

Bottle Washer

The Burnet Co. announces its "Meteor Horizontal" Model LA for automatically washing bottles,



glasses, and so on. Bottles, depending on shape, size and output required, are placed manually or automatically in bottle holders moving in a linear direction; then, they are inverted and progressively conveyed through the various spraying zones. The cleaning process, both inside and out, is performed by heavy spraying pressure. During this operation liquid of each spraying zone is collected and carried off separately by recirculating pump, allowing detergent to be used further. Circulation pump unit insures steady, uniformly strong pressure and permits admixture of solvents. It handles entire size range, e.g., 20 to 100 cc., without change parts. Unit features variable speed; and bottle holders, spray nozzles, water collecting trays, casing of spraying area and other parts coming in contact with liquid are of stainless steel. Circle No. 16.

(Turn page)

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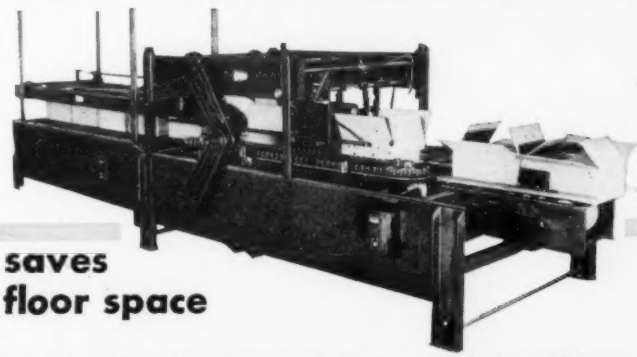

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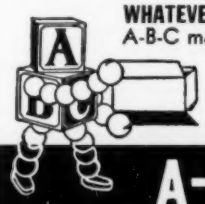

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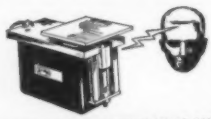

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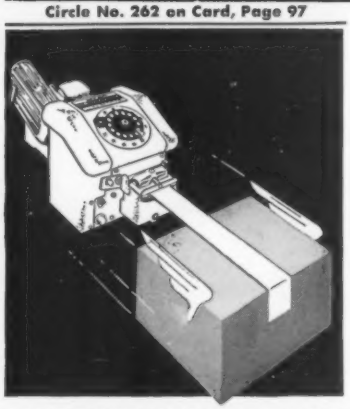
Circle No. 262 on Card, Page 97



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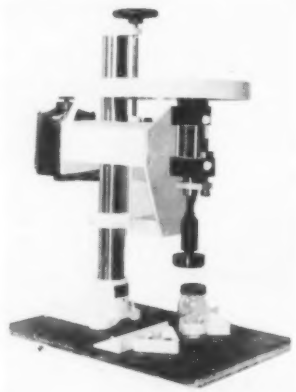
Polyethylene Adhesive

Rubba, Inc. has developed a new adhesive for adhering paper labels to polyethylene containers for permanent, flexible bond. "Rubbatex" may be brushed, sprayed or applied by conventional labeling machines to flexible "squeeze bottles" and semiflexible "unbreakable" polyethylene containers. Fast-grabbing, shock-resistant and having good aging qualities, Rubba says, "Rubbatex" withstands extreme changes in temperature and rough handling. Circle No. 17.

Screw Capper

Scientific Filter Co. announces a new type of air-operated screw capper, Model CFV, for all sizes



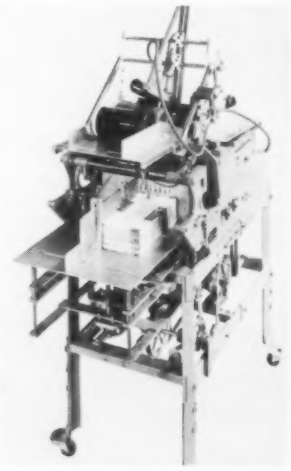
of lug and screw caps, molded and metallic, on glass, tin and plastic containers. Uniform cap tightening is assured by an adjustable friction clutch which can provide any closing torque required for all sizes of caps. Quick-change chucks provide for immediate changeovers from one size or type to another. Movable V-shaped guide centers and supports containers during capping. Attendant places cap loosely on container and inserts it into guide, steps on foot valve which causes air-operated and motor-drive capping head to descend and tighten cap to predetermined tension. Releasing foot valve permits capping head to ascend. Circle No. 18.

Shock Detection System

Inertia Switch, Inc. reports the development of a simple shock detection system, the "V-Dot" indicator. It has only one moving part, an indicating ball, held in center position by a controlled magnetic field, factory-set to withstand normal handling and shocks up to a preset standard. Shock greater than allowable maximum from any direction in a single plane will dislodge the ball from center and trap it at edge of circle. Once indicating ball is triggered, it can be moved back to center only by breaking lead inspector's seal and opening case. Acceptable for military shipments, Inertia says, the "V-Dot" is made of plated steel with high impact plastic window, and measures 1⅛ x1⅛ in. Circle No. 19.

Round Container Labeler

Long and Co. announces its labeling machine for round containers that automatically applies both



spot and wrap-around labels without changeover parts. Featuring automatic escapement, pressure roll, and a large label reservoir, Model 4-A applies labels to 1⅛ to 7 in. diameter containers (approximately 2 oz. to gallons). It feeds, labels and ejects containers at 36/min. Circle No. 20.

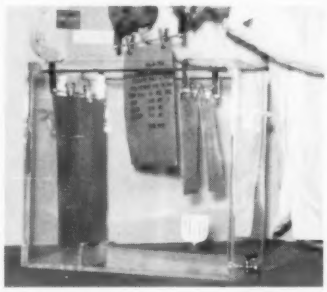
Empty Can Depalletizer

Continental Can Co. has designed two new empty can depalletizing machines which operate at normal line speeds and handle all types of round cans. The manual (464-ECD-2) will depalletize cans up to 700 cans/min. for 300 x 407 size, fully utilizing operator who manually sweeps layers of cans into waterfall blender. Features include: pallet stop to prevent pallet from riding out from under can load, ability to change direction of pallet infeed and can discharge, flared pallet infeed entrance to assist alignment of load in case can layers are slightly uneven. The standard (465-ECD-1) is more highly mechanized, handles up to 900 cans/min. of 300 x 407 size, has powered sweep arm and can transfer (temporary storage) belt. Features include: longer wire mesh belt to permit

continuous sweeping of cans and thereby increase machine capacity, design minimizing tendency to side travel and creeping. Circle No. 21.

Specification Tester

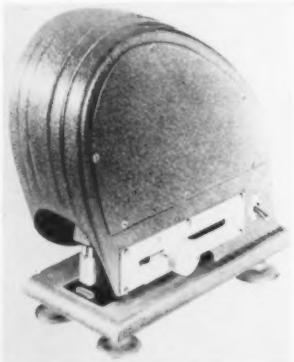
K. R. Colcord, Inc. announces the development of "AMPAC" quality control specification tester, de-



signed for use by military and defense contractors, inspection personnel to easily and visibly test items packaged and unpackaged in accordance with governmental specifications, such as Mil-P-116C. Advantages: (1) Water immersion, organic acid, and carbon tests and specification bag testing may be done with no danger to personnel's hands. (2) Horizontal and vertical leakage tests may be done simultaneously. (3) All faces of the items or packages under test are constantly visible. (4) The unit may be used equally well on small production lines as in the laboratory. Circle No. 22.

Electric Stapler

The Staplex Co. has added "Staplex S-54" to its line of automatic electric staplers. Completely auto-



matic with no hand or foot controls, to staple, the bag or other item is inserted into the unit, and machine drives a standard, preformed staple. Unit has no motor and operates only as work is fed to it. Circle No. 23. (End)

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Cellophane Data

E. I. du Pont de Nemours & Co. (Inc.), Film Dept., has a 6-page brochure, A-6166, listing the properties and uses of 30 varieties of cellophane for the packaging requirements of many products. It includes a chart showing the yield, thickness, principal uses, and properties of plain, moisture-proof, heat sealing, and polymer-coated films. Circle No. **101.**

Skin/Blister Forming

Atlas Vac-Machine Corp. offers a 4-page folder, illustrating and describing in detail its line of forming equipment. Many sizes and types of machines are discussed, from those suited for laboratory work to those intended for large scale automatic production. Circle No. **102.**

Conveyor/Carton Sealer

Better Packages, Inc. offers literature on its "Boxize" No. 5 conveyor. Cartons to be sealed enter the "Boxize" one at a time from a storage conveyor. Each box measures its own tape length, which is automatically dispensed over the center of the box for quick and easy application by the packer. Release of sealed carton automatically permits next carton to enter sealing unit from storage conveyor. Tape dispensing unit is adjusted to permit passage of tallest carton in assortment being sealed, and accommodates cartons up to 26 in. high. The standard unit handles cartons up to 30 in. long and 23 in. wide. Circle No. **103.**

Low Static Styrenes

Monsanto Chemical Co. offers information on its two low static styrenes, "Lustrex Lo-Stat 22" and "Lustrex Lo-Stat 29," that can be injection molded into products having virtually no attraction for dust particles. These materials practically eliminate electrostatic fields which attract dust and hold it on surfaces of molded pieces. Type 22 is a standard molding grade and type 29 is a formulation with improved heat resistance; both are suited for such applications as package closures. Circle No. **104.**

Cereal And Cake Mix Packaging

Lynch Corp. has a 6-page brochure illustrating how its "Robo Wraps" and "Robo Lift" were utilized in packaging cereal and cake mix. Photographs of equipment and plant layout are given. Circle No. **105.**

Handling Equipment

Syntron Co. has available a 68-page illustrated catalog, No. 591, on its materials handling equipment, parts handling equipment, power rectification equipment, mechanical shaft seals, paper joggers and portable construction tools. Included in the catalog are descriptions, data and specifications, and illustration showing products in operation. Circle No. **106.**

Polyethylenes And Polystyrenes

Koppers Co., Inc. has a 4-page bulletin, No. C-O-135, on its rigid and expandable polystyrenes, and its conventional, intermediate and high-density polyethylenes. Descriptions, physical properties and applications are given. Circle No. **107.**

Nonreturnable Bulk Liquid Package

Hedwin Corp. offers a 4-page brochure on its "Cubitainer" package. A nonreturnable package designed to handle bulk liquids, it is composed of two parts: A semirigid molded plastic liner that is inserted into a cube-shaped corrugated container. Its advantages are listed and illustrated, and a list of products being packaged in "Cubitainer" is included. Circle No. **108.**

Polystyrene Film

The Dobeckmun Co. has available a 4-page brochure that includes a detailed chart listing the physical and chemical characteristics of "Trycite," a low-cost polystyrene film. This material is suitable for self-service applications such as foodstuffs, soft goods and stationery. Circle No. **109.**

Dry Product Packaging Machinery

Frazier and Son has a 6-page illustrated brochure on its complete line of packaging machinery for dry products. Photographs and descriptions of each unit are included for each unit—volumetric bench, in-line and rotary fillers, net weighers and elevator-feed conveyors. Circle No. **110.**

Multiwall Packaging

International Paper Co., Bagpak Div., has issued an illustrated 4-page brochure, "Complete packaging service," which outlines its line of multiwall bag packing and closing equipment. Specifications and descriptions are included for the machinery, and diagrams of a variety of bag closures that are available. Circle No. **111.**

Aluminum Containers

Reynolds Metals Co. has a 16-page booklet giving specifications and illustrations of a variety of rigid foil containers. These include boxes, trays, pans, dishes and plates—available in round and oblong shapes. Methods of measuring such containers and a listing of several closing machines to which they are adaptable are also included. Circle No. **112.**

Heavy Duty Checkweigher

Toledo Scale, division of Toledo Scale Corp., offers an illustrated, 4-page folder on its Model 9460 high-speed automatic checkweigher. Featuring 100 per cent in-line checkweighing speeds up to 40/min., it handles bags, boxes, packages, slabs, and other items. Weight range is 50 to 200 lb.; zone widths vary from 2 to 8 oz. with accuracy of (±) ⅛ oz. Optional accessories include automatic pilot lights and numerical counters. Circle No. **113.**

Case Opening Device

General Corrugated Machinery Co. offers an information sheet describing its attachment for box taping machines that automatically applies a rip-cord to regular sealing tape as it is being applied to corrugated box flaps. This device permits easy opening of box flaps and facilitates removal of contents. Circle No. **114.**

Silicone Rubber Fibrous Cushioning

The Connecticut Hard Rubber Co. has available a data sheet on its silicone rubber fibrous mat, which, they say, possesses qualities superior to those of silicone sponge and foam. Among its properties are—low compression set, good tear resistance, and good tensile strength. Circle No. **115.**

Corrugated Box Making Machine

Colt Packaging Machinery Co. is offering a brochure describing its "Rite-Size" box machine, designed to produce, from corrugated sheets, unlimited styles and sizes of shipping containers, plus pads and liners. Changeover of sizes can be made in approximately 1½ min. Diagrams suggest floor plans (covering only 1,600 sq. ft.) for setting up a box making department. In addition to general information, a description of how the machine operates and its limits and allowances are included. Circle No. **116.**

Adhesives For Carton Sealing

Morningstar-Paisley, Inc. offers technical service bulletin No. 24, "Small carton sealing." Discussed in this 8-page bulletin are the mechanics of carton sealing, types of carton stock, sealing machines, and a descriptive list of the Morningstar's adhesives available for this use. Circle No. **117.**

Polypropylene

AviSun Corp. offers a 4-page preliminary technical data bulletin on

for spirally-wound tubes used for packaging foods or industrial products containing oils, as wrapper for protecting oiled metal parts against moisture, and as carton liner for packaging moisture-sensitive products. Sample included. Circle No. **131.**

Heat Seal Wrappers

Scandia Manufacturing Co. offers a data sheet on its Model SUS wrapping machines. Using roll-fed cellophane, waxed paper, and so on, this equipment is available in two sizes that handle packages ⅝ to 3¾ in. high, 2 to 14 in. wide, and 2 to 10 in. long. Speeds range up to 60 packages/min. Circle No. **132.**

Plastic Fitment Applicator

Resina Automatic Machinery Co., Inc. has an information sheet describing its Model SA plastic fitment applicator. This machine can operate independently or with a screw capper. It selects and applies perforated plastic fitments of varied sizes. It also handles the solid type of fitments with side tabs commonly used in drug and pharmaceutical fields. Circle No. **133.**

Container Feeder

U. S. Bottlers Machinery Co. has a 4-page folder describing its container feeder which handles rounds, squares, panels, ovals in glass, cans, or jars. The variable speed is adjustable, permitting speed range of from approximately 12 cycles/min. minimum to approximately 39 cycles/min. maximum. Circle No. **134.**

Vacuum Filler

Machinery Service Co. has a brochure that lists various features of its M-S rotary vacuum filler. Available in 12-, 18-, or 24-filling tube models, the unit is designed for high-speed filling of any free-flowing liquids, light or heavy, foamy or syrupy. Circle No. **135.**

Corrugated Packaging Problems

Hoerner Boxes, Inc. offers a 12-page brochure describing corrugated packaging problems and solutions. Actual case histories involving shipping problems are included for products ranging from bicycles to dog food. Circle No. **136.**

Adhesives

H. B. Fuller has available a booklet describing characteristics of some of its standard line adhesive products applicable to film, foil, bags, envelopes, folding and set-up boxes, and for case sealing and bottle and can labeling. Circle No. **137.**

Automatic Net Weighing

The Exact Weight Scale Co. offers brochure No. 3318, describing its automatic net weighing machines for weighing a wide variety of products. Quantities from 1 oz. to 3 lb. can be handled on one model and 3 to 10 lb. on the other. Heavier capacities run up to 100 lb. Operation may be fully automatic or push-button actuated on either or both filling or dumping of material. Machines are illustrated by both photographs and line drawings, with specifications. Circle No. **138.**

Automatic Capping

Consolidated Packaging Machinery Corp. has a 6-page bulletin illustrating and describing eight different models of automatic capping equip-

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ment. Photographs of actual installations and a list of users accompanies the descriptive text and general machine specifications. Circle No. **139.**

Band-Type Heat Sealer

Ralph Chaffee & Co. has an illustrated brochure describing its "Rotor-Sealer." Used in heat sealing thermoplastic materials through a heated metal band, this machine is available in three models. It features forced water cooling, a thermostat range to 600°F., and operates at speeds up to 315 in./min. Sealing widths available are ⅛, ½ and ¾ in. Circle No. **140.**

Automatic Vial Filler-Capper

Arenco Machine Co. has information on its "Capsolut Cartrix" unit for feeding, capping, and sealing small bottles and vials. Vials are fed to a rotary carrier from the magazine at synchronized speeds. First filling of about 50 per cent of container volume and main fill at which remaining air is forced out of container prevent air bubbles from accumulating. Seals are sorted and fed from vibrator through feed slide and are positioned on containers. A spinning mechanism with adjustable piston and spinner pressure seals containers. Circle No. **141.**

Plastic Containers

Celluplastic Corp. has a brochure illustrating its range of stock plastic vials and jars. The line includes rigid polystyrene vials from ⅝ to 2 in. in diameter, with lengths up to 6 in. Extruded flexible acetate and butyrate vials are available in diameters from ½ to 1-⅝ in., in almost any desired length. Also described is a line of squat jars in sizes up to 16 oz. The vials come in crystal clear plastic, as well as a variety of colors. Multicolor printing of label or trademark is available. Circle No. **142.**

Shipping Room Pointers

Mid-States Gummed Paper Co. has a 24-page booklet, "Shipping room pointers," discussing various types of tapes, their uses, how tapes should be stored, how to get best results from tape dispensers and ideas for application. Circle No. **143.**

Heavy Duty Heat Sealer

Wrap-Ade Machine Co., Inc. offers a data sheet giving specifications for a pneumatic heat sealer. This machine heat seals bags, pouches, envelopes, barriers, and so on, made of kraft and scrim-backed laminates, cellophane, foil, pliofilm, and so on. The unit features automatic control of pressure up to 1,187 lb., dwell up to 15 sec. and heat up to 550°F. Circle No. **144.**

Collapsible Metal Tubes

Standard Collapsible Tube Co. has a 16-page booklet describing its line of collapsible metal tubes. It explains the metals, coatings, and finishes used, and enumerates tube sizes, openings, caps, and applicator pipes available. Tube packing and shipping methods are also listed. Circle No. **145.**

Packaging Adhesives

Arabol Manufacturing Co. has a booklet entitled, "How to buy adhesives for better adhesion," which offers 23 yardsticks for selecting the right adhesive for a particular application. Some factors to be considered: material being used; length of time adhesive must "stick;" conditions such as dry heat, dry cold, moisture with which product may come in contact; how adhesive is to be applied. Circle No. **146.**

Industrial Adhesives

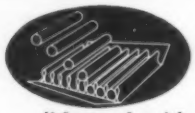
Permacel offers a detailed catalog on its industrial adhesives. Included are product write-ups on each of 28 different adhesives, giving composition, properties, characteristics, bonding, application, and uses of each as well as prices and ordering information. Circle No. **147.**

Carton Filling And Sealing

Food Machinery Corp. Packaging Machinery Div., Stokes & Smith Plant, offers an 8-page folder describing its complete line of "Neverstop" automatic carton filling and sealing machinery which handles free-flowing products. Specifications for six models are included with choice of speeds, carton size, glue, filling method and optional equipment. Circle No. **148.**

Protective Packaging

Jiffy Manufacturing Co. offers a specification sheet that enumerates the various grades of "Kushion-Kraft" available in sheets or rolls. Designed to provide surface protection and cushioning against shock, this material consists of plies of processed and corrugated paper in either kraft or tissue, or a combination of both. A specification table lists various weights in four different grades of this material. Circle No. **149.**



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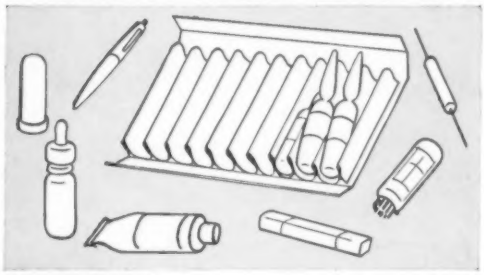

WHAT RONDO IS:

A packing system comprised of trays with fluted partitions which hold inserted articles by a spring-clip action.

WHAT RONDO DOES:

PROTECTS small delicate objects against shock and breakage while transporting, because they are suspended in a cushion of air. (medical vials and tubes, electronic components, etc.)

FACILITATES handling, not only in production, storage, inventory, and shipment, but also at the receiving end. This also applies to less fragile products. (cosmetic containers, watch cases, tools, etc.)

COMBINES safety, full visibility and economy from the production line to the point-of-sale display. (pens, crayons, artists' colors, etc.)

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Holds objects from 5/16" to 1¼" in diameter
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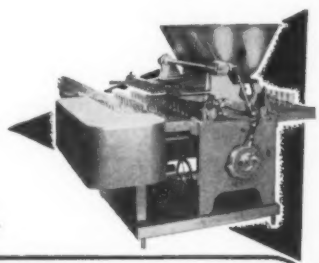

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To make sure your containers are free from foreign matter when filled, use the GEYER ROLL-OVER CLEANER. It removes glass pieces, dust and dirt from containers by inverting them 180 degrees and cleaning by air blast. This roll-over method is safety insurance for any packer because it assures positive cleaning. Speeds are from 40 to 200 containers per minute.

GEYER equipment is available in any size to meet your need. Write or call for details.

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Circle No. 266 on Card, Page 97

Circle No. 267 on Card, Page 97

Polyethylene Film

Spencer Chemical Co. has a comparative film property data sheet. It compares its "Poly-Eth Hi-D" 2504 with conventional density polyethylene in respect to such characteristics as melt index, tensile strength, elongation, tear strength, and so on, and refers to the ASTM test methods used. Circle No. **150.**

Release Papers

Rhinelander Paper Co. has available a brochure containing samples and technical data on its line of "Ripco" release papers for pressure-sensitive backing and in-plant processing and packaging. It comes in roll widths up to 110 in. and a variety of sheet surfaces. Circle No. **151.**

Cellulose Wadding

Cel-Fibe Div., Personal Products Corp., offers an 8-page illustrated brochure on its cellulose wadding material. Regular types of Cel-Fibe wadding include bleached, unbleached, facial-tissue quality, moisture-absorbent, moisture-resistant, wet-strength. Applications in handling, shipping, storage, converting and manufacturing are shown. Circle No. **152.**

Automatic Cartoners

R. A. Jones & Co., Inc. offers an 8-page brochure on two models of its "CMV" automatic cartoning macine. These units take a flat carton from a magazine, open it, tuck bottom flaps, convey open carton past manual loading stations, tuck top flaps, convey open carton past manual loading stations, tuck top flaps and deliver the loaded carton. Cartons handled range from ½x¾x2½ to 4¼x4¼x9 in. Circle No. **153.**

Gummed Tape Usage

Central Paper Co. has a 10-page booklet, "Why gummed tape sticks," which discusses the correct way to apply tape and take care of taping equipment. Circle No. **154.**

Wrapping Machines

Hudson Sharp Machine Co., division of Food Machinery Corp., offers a 12-page brochure on its automatic "Campbell" wrappers. Illustrations show a number of different models and the corresponding types of products each package-wraps. A cutaway illustration shows how the basic machine functions and diagrammatic pictures show types of seals and folds available. Circle No. **155.**

Bag Closer Maintenance

Dave Fischbein Co. offers a folder listing its cleaning solvents, lubricants for bag sewing machines, and thread lubricants. Circle No. **156.**

Cellulose Sheeting

Eastman Kodak Co., Cellulose Products Div., offers a 4-page bulletin, "Properties of Kodapak sheet," a thermoplastic cellulose ester sheet. Graphs and charts outline the physical properties of the three available types. Circle No. **157.**

Adhesive Handling

National Starch & Chemical Corp., Adhesives Div., has a booklet, "How to prepare and use glues, pastes and gums." It tells how to store and care for glue, how to prepare equipment, how to thin prepared glues and pastes, and reviews six different general types of adhesives. Circle No. **158.**

Automatic Pouch Machine

Bartelt Engineering Co. has a brochure, "Machinery for creative packaging," which explains the basic concept of its pouch machine. Base machine forms a package from film or paper, opens it, and seals it after filling. Many filling and measuring units can be integrated with this equipment, on one drive shaft. Booklet illustrates adaptations of this machine for packaging both dry and liquid products. Circle No. **159.**

Translucent Film Adhesive

Interchemical Corp.'s Angier Adhesives Div. has data on its "Double-Face" pressure-sensitive translucent film adhesive. "Double-Face" is said to be useful for laminating to open and closed-cell foam materials such as vinyl foam, polyurethane foam, polyester foam, and rubber foam. The adhesive is reinforced by a nonwoven tissue which prevents excessive penetration. Circle No. **160.**

Polyethylene Blends

Semet-Solvay Petrochemical Div., Allied Chemical & Dye Corp., offers Bulletin P/S 234, listing advantages of A-C polyethylene, an inert, low-molecular weight polymer, which can readily be blended with waxes, polymers, and resins in hot-melt or water emulsifiable grades. When added to wax coating it improves gloss, reduces scuffing, and imparts a high blocking point, Sem-

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the tightest sticking pressure-sensitive label on the market!

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The metal FOLD-UP tube is still the best package for tooth paste. Consumers say so. Tooth paste manufacturers who cater to consumer tastes depend on Wheeling Stamping for FOLD-UP tubes—lead, tin, and aluminum.
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et-Solvay says. Checklist of product applications is included. Circle No. **161.**

Metal Parts Packaging

Wood Conversion Co. offers brochure No. 645-458 containing samples of "Tufflex," neutral cushioning fabrics used for protecting small parts in shipment and storage, and vertical liners for tote boxes, assembly table and storage bins. These fabrics conform to packaging specifications of the U. S. Army. Illustrations of packaging methods are included. Circle No. **162.**

Packaging Machinery

Peters Machinery Co. has an 8-page catalog of its packaging machinery, including equipment for Peters' style carton forming and lining, carton folding and closing, and carton and tray forming and gluing. Carton sizes, machine specifications, and installation floor plans are included. These machines range from 30 to 175 or more units/min. Circle No. **163.**

Wrapping Machines

Oliver Machinery Co.'s Bulletin No. 550815 describes its automatic wrapping machines. These units wrap a variety of articles of rectangular or irregular shapes such as cakes, cookies, candy bars, frozen foods, dried fruits, textiles, and so on. They can overwrap cartons, trays, U-boards, and flat cards; or the product may be wrapped without any support. These machines handle waxed paper, glassine, cellophane, or almost any other heat-sealable material. This folder also describes a label imprinter and package-top labeler that handles thermoplastic labels. Circle No. **164.**

Plastic Vials

Lermer Plastics, Inc. has an illustrated data sheet listing various sizes of its stock line of plastic transparent vials. Available in minimum quantities of 1,000, types include threaded vials with metal screw caps, shoulder vials with polyethylene slip-on caps, or shell vials with polyethylene plug closures. Sizes range from ½x2 to 1x4 in. Circle No. **165.**

Case Stapler

International Staple & Machine Co. has a 4-page brochure explaining details of the "Dual Stapler." This machine simultaneously staples tops and bottoms of many types of shipping cases, after they have been filled. Case sizes handled range from 5 to 24 in. wide and 5 to 36 in. high. Circle No. **166.**

Foot Power Staplers

Fastener Corp. has a 4-page folder illustrating its line of "Duo-Fast" staplers for packing and shipping. Models described in this folder are designed to handle almost any stapling situation. Pictures of staplers are included. Circle No. **167.**

Pillow-Type Packager

General Packaging Equipment Co. has a brochure on its automatic packer that forms pillow-type packages up to 6½x12 in. from any heat sealable rollstock and fills with any free-flowing material at speeds of 30 to 60/min. Requires 32x32-in. floor space, and stands 97 in. from floor to top of scales. Circle No. **168.**

(Turn page)

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ALL STYLES • ALL SIZES
Produced with fine materials:
POLYETHYLENE, VINYL, LAMINATES
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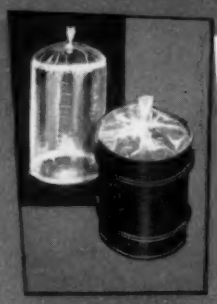
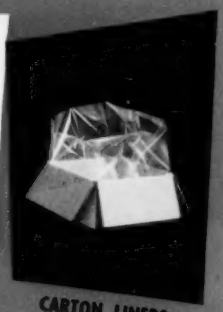

DRUM LINERS

BAGS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. . . originated and manufactured by the pioneers in plastic-liners for steel drums, fibre containers, cartons and boxes . . . successfully tested and proven satisfactory for protective packaging by many of America's leading manufacturers, processors and laboratories.

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For more information circle No. 270 on Reader Service Card, Page 97

wrap-ade

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- LIQUIDS
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- TABLETS
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or any reasonably flat small product

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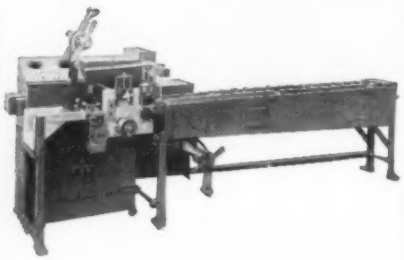
ADJUSTABLE UNIT PACKAGER with CONVEYOR FEED

Ideal for packaging small textile products, flat food items, paper goods, toys, bandages, hardware, or any other reasonably flat small product. Speeds up to 130 packages per minute.



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Celebrating a Quarter Century of Progress in Packaging

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For more information circle No. 271 on Reader Service Card, Page 97

Silent-Type Vibrator

Martin Engineering Co. has a 4-page catalog sheet on its "Vibrolator," a silent-type vibrator operated by compressed air or steam. It keeps moist or dry materials moving. Do's and don'ts are listed for successful application. Circle No. **169.**

Rust-Inhibitor Film

Daubert Chemical Co. has a brochure describing "Nox-Rust Clear Pak," a high strength polyester film coated on one side with a special composition which contains volatile corrosion inhibitors. The film is heat-sealable and suitable for use on automatic packaging machinery. Test method is included in brochure for determining time interval required by corrosion-inhibitor papers to establish a protective atmosphere. Circle No. **170.** (End)

Effect of packaging on palatability of frozen beef steak

(Continued from Page 89)

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(3) Winter, J. D. and Hustrulid, A.,

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Saves on container printing costs... eliminates hand-stamping... insures faster identification

- Low-cost . . . pays for itself in months
- Compact . . . works by friction . . . requires no troublesome adjustments
- Install it yourself on any conveyor, case-sealer, etc. to mark from side or top
- Not a gadget — beautifully designed and precision-made to give consistently dependable performance, uniform impressions
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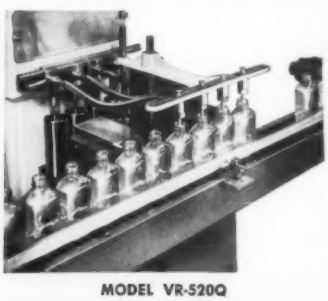

MODEL VR-520Q

Higher speed and increased accuracy of a broad range of drug and cosmetic products is now possible with this new development. Especially designed for handling broad line of plastic containers where vacuum or gravity filling is not suitable. Dispenses accurately aqueous solutions, oils, light creams and suspensions up to 8 oz. All stainless steel liquid contact parts; provision for rapid disassembly for cleaning and sterilization.

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Perfe-Klum®

Write for Bulletin #358CF—also Bulletin 955A describing 12 different filling machines.

Circle No. 272 on Card, Page 97

Circle No. 273 on Card, Page 97

"Flavor factors in frozen-food wraps," *Modern Packaging* **24** (1951), No. 9 (May), pp. 133-37, 184, 186.

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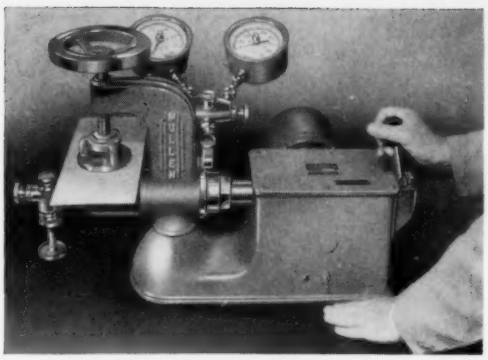

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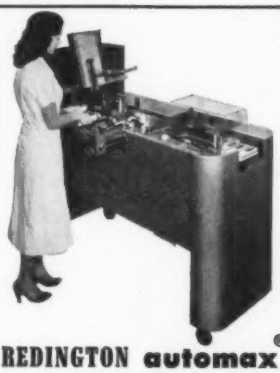

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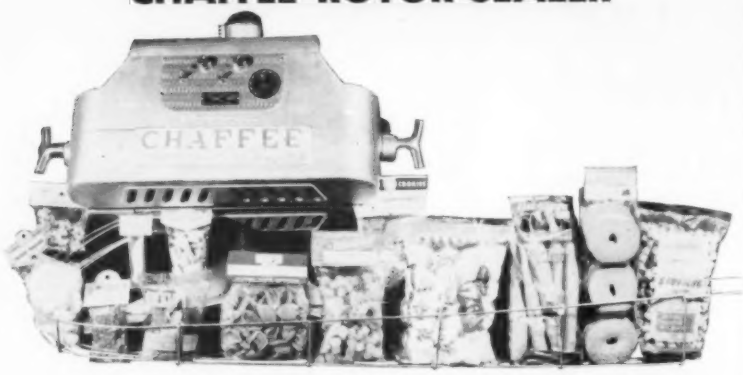

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Tape reinforces container scorelines, conserves fibreboard

(*Continued from Page 46*)

nature that a scoreline reinforcement is required.

Reduce Packaging Costs

Going a few steps further, tape reinforcement could be used commercially to reduce packaging cost through use of lower grade boards and reduction in steel strapping requirement with attendant marginal saving in labor, storage, and shipment. Also the cost would be reduced by the slight reduction in cube and weight.

A user who has had trouble using 200-lb.-test board, and has increased the board-test requirement, may be able to return to 200-lb.-test board. A shipper who uses a lengthwise and girthwise strapping pattern may be able to reduce to one strap or perhaps none, since

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the tape reinforcement need not be limited to the horizontal end scorelines.

With the variety of tapes, adhesives, and pressure-sensitive tapes available, the fibreboard box maker has wide gamut to run in supplying a much stronger container at lower cost.

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(3) *Overseas shipping test of V-board containers, Part I,* (Fort Lee, Virginia: Quartermaster Research and Development Field Evaluation Agency) QM BS297-5203, February 17, 1954.

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Book review

Basic engineering approach to structural package design

There is a definite need for technical literature on all phases of functional packaging. One step towards helping this shortage, **Package Design Engineering** should fill one of the many gaps—that of the fundamental engineering approach to good physical packaging design.

Published April 24, 1959, the book contains material originally prepared by the author, Kenneth Brown, for a packaging course he teaches at the University of California at Los Angeles where he is a member of the technical teaching staff. Also a member of the technical staff of Space Technology Laboratories, Inc., he holds a B.S. and M.S. degree in mechanical engineering and has given talks on technical packaging to various packaging groups. Previous positions in industry include such companies as Convair, Hughes Aircraft, and North American Aviation.

The cloth-bound book contains 263 pages, comprising 19 chapters of which the first eight contain some basic fundamentals that the packaging engineer needs to know in solving structural packaging problems. Starting with the scope of the packaging field, role of the shipping container, and design considerations, the author gives a very

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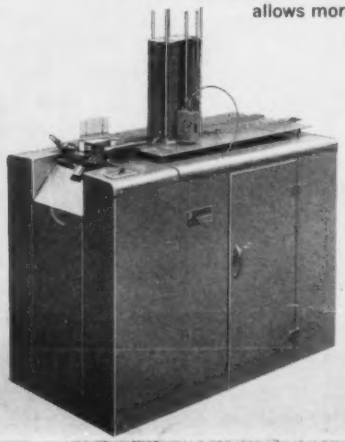

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brief review of mathematical functions necessary for understanding the contents of the book.

Is Handy Reference

Of more value than the mathematical review section, which is extremely elemental (grammar and high school level), Chapters 2 through 8 contain certain laws and principles of mechanics on which good physical package design is based. **Such items as forces and vectors, equilibrium and moments, motion, velocity and acceleration, and laws of motion are covered.** The various principles and definitions are explained sufficiently so that the reader may understand the remaining chapters. The subjects discussed can be found in any good book on general physics. In fact, if the reader desires a great amount of detail concerning the study of mechanics, he must turn to such a textbook. However, Brown has apparently tried to condense into a single, handy reference only that information needed by the packaging engineer.

The next four chapters deal with structural packaging design, and include selection of optimum cushioning, tension spring package, full suspension package, and rubber shear mounts. Optimum cushioning covers such points as load energy, force/energy-load, and shock force-static weight curves; cushioning factors; cushioning reliability; and economics of optimum cushioning. For the two types of package—tension spring and full suspension—Brown explains their use and design. Several methods of the use of rubber shear mounts are discussed.

In the following three chapters, the fundamentals of dehumidification and pressurization, vibration, and package test instrumentation are covered—all as applied to the ability of a package to protect its product from breakage. Discussed under these subjects are such things as humidity control; dehumidification methods; use of dessicants; frequency, amplitude, and so on, under vibration; such tests as shock, vibration, atmospheric exposure; and testing equipment.

Has Many Illustrations

Covering only very basic principles and methods of approach, **the last four chapters deal with fibreboard and plywood shipping containers, sheathed crates, and metal shipping containers.** The text is limited since each subject is complicated enough to fill several volumes.

About 235 illustrations—graphs, charts, line cuts, and photographs—and over a dozen tables allow the reader to follow the subject matter easily. Numerous basic formulas and equations are set forth and are explained well. For the reader who wants to use the material as a textbook, many problems are found at the end of some of the chapters. The answers are not given; so, the reader who works the problems does not know definitely if he has done them correctly. For this reason it seems that, if a revision is contemplated, it would be a valuable aid to the reader to include the solutions—at least the answers.

Second In A Series

Reportedly the second in a materials handling and packaging series, the book deals with functional packaging in regard only to protecting industrial items against breakage and possible adverse effects of atmospheric conditions. **There certainly is a need for such texts on functional packaging from the standpoint of protecting small packages—cellophane bags, small plastic containers, glass jars, and so on—from damage, as well as the role such individual small packages play to protect their contents from spoilage. It is hoped that this series will eventually include volumes on these latter phases of functional packaging.**

Well indexed, the book is published by John Wiley & Sons, Inc., New York, and is available at most bookstores carrying technical books. Retail: $8.50.—H.E.V., Jr.

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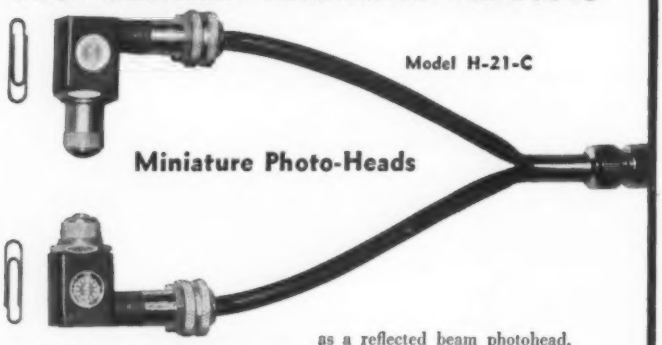

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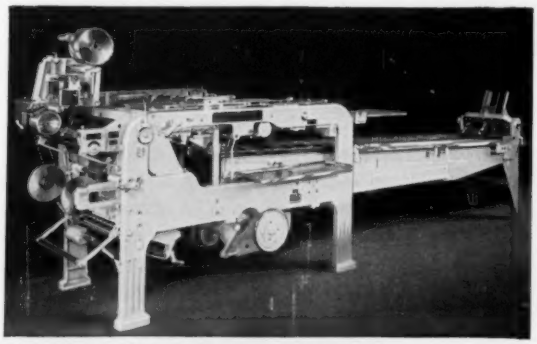

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Structural design notes for corrugated containers

Note No. 9:

Flat-crush test of corrugated board

By K. Q. Kellicutt,
Engineer,
Forest Products Laboratory,
Forest Service,
U.S. Department of Agriculture,
Madison, Wisconsin

Introduction. The flat-crush test is primarily a test of the corrugated section of single- and double-faced, single-wall fibreboards. **It is used mainly for quality control,** as the values obtained with it reflect to some extent the quality of the fabricated board. Distorted, cracked, and cut corrugations; insufficient adhesive; and in some instances, the testing machine, as well as the testing technique, are factors that affect flat-crush values. It is a relatively simple test to make.

The importance of developing high flat-crush corrugating mediums has been greatly overemphasized, because there is little, if any, direct correlation between flat-crush values and performance of a corrugated box. Nevertheless, **there has been a continuing trend to develop corrugating mediums that will yield higher flat-crush values.** Generally, the increase has been achieved through the use of hardwood pulps, consisting of shorter, stiffer fibers, and by increasing the weight of the corrugating medium. The shorter fibers of the hardwoods, which are pulped by the semi-chemical process,* corrugate into well-formed stiff flutes; but, in some instances, the justification of using such mediums in weights greater than 26 lb./1,000 sq. ft. is questionable. This is especially true when the heavier mediums are used primarily to develop higher flat-crush values.

*Developed at FPL, 1924.

Flat-Crush Test

The flat-crush test consists essentially of applying a continuously increasing force upon the faces of a sample of corrugated board until the corrugations buckle and crush. The maximum force in lb./sq. in. thus attained is generally designated as the flat-crush value for the board.

The crushing force is applied at the rate of 15(±5) lb./sec. when the platens of the testing machine are in contact. The edges of the specimen must be sharp and the corrugations adjacent to the cut edges not crushed or broken. The specimens may be either square or round, and of any convenient size, provided the area can be accurately determined. Generally, a minimum recommended size is 5 sq. in.; a convenient size is 10 sq. in.

Perhaps the most important factor in making the test is the testing machine. The loading platen must be kept parallel to the weighing platen, and both need to be restrained to prevent lateral movement during the test.

The effect of lateral movement and slippage of the specimen on the test values was determined at FPL in 1951 (*5*), and revealed that, **when slippage and movement are permitted, the resulting flat-crush values may be appreciably reduced.**

ASTM has a standard method of test (*4*) that gives the details for making the test. Further evidence of interest in the test is the fact that H. G. Nelson† is heading a special committee of TAPPI to study the flat-crush testing of corrugated (*3*).

This note is confined primarily to corrugating mediums described in Note No. 7 (*1*), which were semichemical mediums made on the FPL paper machine in weights between 9.8 to 53.2 lb./1,000 sq. ft.

Relationship Of Flat Crush To Board Properties

It is not uncommon for the force required to crush B-flute board, in the flatwise direction, to exceed 50 lb./sq. in. Values for specially treated mediums may exceed 75 lb. Because C-flute board has less flutes per lineal ft. of board than B-flute, and because its flutes are higher and consequently less stiff, it will not attain as high a value as B-flute for a specific corrugating medium. Although A-flute board is made with higher flutes, and fewer of them, than the C-flute, it occasionally attains a flat-crush value of 50.

These values are cited primarily to emphasize the fact that **tremendous flat-crush strength can be attained when the flute is properly formed and the test is carefully made.** The question, however, is, how much flat-crush strength is needed in the material of a box?

Assume a box panel 15x15 in. providing an area of 225 sq. in., has a flat-crush value of 50 lb./sq. in. A force of 11,250 lb. is required to crush the board. Reducing that value by 50 per cent to compensate for a high moisture content condition, and another 50 per cent to allow for a sustained dead load on it, still leaves the panel with a potential strength of 2,812 lb. in flat-

†Owens-Illinois Glass Container Division.

TABLE I

Flat-Crush Values For 24 Experimental A-Flute Corrugated Boards*

Weight Of Components (lb./1,000 sq. ft.)		Flat-Crush Values (lb./sq. in.)	
Liners	Corrugating	Individual	Group Average
25.9	9.8	5.41	
42.5	9.8	6.73	
60.8	9.8	6.62	6.25
25.9	18.0	18.77	
42.5	18.0	20.60	
60.8	18.0	18.70	
92.6	18.0	20.80	
117.1	18.0	21.00	19.97
25.9	24.7	31.13	
42.5	24.7	32.40	
60.8	24.7	34.00	
92.6	24.7	34.00	
117.1	24.7	25.90	31.48
42.5	32.4	37.00	
60.8	32.4	44.50	
92.6	32.4	42.60	
117.1	32.4	47.90	43.00
42.5	45.5	46.60	
60.8	45.5	53.60	
92.6	45.5	54.70	
117.1	45.5	49.70	51.15
60.8	53.2	61.70	
92.6	53.2	60.30	
117.1	53.2	55.30	59.10

* Made from various weights of Fourdrinier kraft liners and semichemical corrugating mediums.

wise crush. Considering the fact that the weight of the contents of the box is not likely to exceed 160 lb., the flat-crush value appears appreciably higher than necessary, even allowing for the fact that the corrugations must withstand printing pressures during fabrication and the likelihood that the box and its contents may be dropped, subjecting the corrugations to dynamic loads.

Research is under way at FPL to determine what strength the corrugating medium needs to be to perform its primary function of spacing the load-carrying liners and preventing them from buckling while under compressive loads. Some of the experimental paperboards being used in this work were included in Table I of Note No. 7.

Flat-crush values for the various weights of the aforementioned corrugating mediums were fairly similar for a specific weight of medium, regardless of the weight of the liners with which it was combined. For example, when the 18-lb. grade of medium was combined with liners ranging in weight from 25.9 to 117.1 lb., the difference between the lowest value and the highest value was only 2.3 lb./sq. in. Considering the inherent variability of paperboard, this spread of values is about what can be expected.

The spread was somewhat greater for the group of boards with the corrugating medium that weighed 24.7 lb./1,000 sq. ft. This was due mainly to the low values obtained for the board with 117.1-lb. liners. Upon closely examining the board, the low values could be accounted for by the fact that the flutes leaned slightly, which caused some cracking and flattening of their tips adjacent to the double-back liner.

The same condition existed, but to a lesser extent, for the board consisting of 42.5-lb. liners and 32.4-lb. corrugating medium. Although the bond for this board was sufficiently good to pull fibers from the liners upon their removal, a slightly heavier application of adhesive on the double-back side would have provided a better fillet on the tips of the flute. This in turn would have raised the values. The flat-crush values for the 24 boards are included in Table I.

Means Of Predicting Flat Crush

To enable a manufacturer of corrugating medium to predict the flat-crush value of his product without first making it into board, Long and Maltenfort developed a method and equipment (*2*) for accomplishing the task. More recently, a proposed tentative method of test for flat crush of corrugating medium, based on their work, has been prepared by ASTM. Actually, the test (CMT) consists of corrugating small strips of medium in a Concora medium fluter, which are tested immediately. **With the use of tabular data which Long and Maltenfort developed, the flat crush of A-, B-, and C-flute board can be predicted with reasonable accuracy.** A comparison of predicted values, based on the corrugating medium test (CMT) and actual flat-crush values for the six mediums discussed, is given in Table II.

In summary, it may be stated that the flat-crush test, if made carefully, may be useful in checking the quality of corrugated board fabrication. Box performance cannot, however, be predicted from flat-crush values only, primarily be-

TABLE II

Corrugating Medium Test And Comparison Of Predicted To Actual Flat-Crush Values*

Basis Weight Of Corrugating Medium (lb./1,000 sq. ft.)	Corrugating Medium Test Value (lb.)	Flat-Crush Value (lb./sq. in.)	
		Predicted	Actual
9.8	10.7	.....	6.25
18.0	45.8	23.42	19.97
24.7	85.1	39.64	31.48
32.4	97.5	44.80	43.00
45.5	101.8	46.60	51.15
53.2	111.0‡	50.40	59.10

† Average values taken from Table I.
‡ Flutes slanted on all specimens.
* For 6 experimental semichemical corrugating mediums; A-flute boards.

cause the strength and weight of the liners are not reflected in the flat-crush values.

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(2) Long, F. D., and Maltenfort, G. G., "A new test for corrugating medium," *Fibre Containers*, 37 (1952), No. 12, and *Tappi*, 39 (1956), No. 9.

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(5) "Suggestions in making flat-crush tests of corrugated," *Fibre Containers*, May, 1951. (*End*)

Specifications/control of packaging adhesives

(*Continued from Page 79*)

be able to tell whether he is treading on dangerous ground with regard to product age.

If any adhesive shipment shows any of the following symptoms, it becomes legitimate cause for storage concern:

1. Any abnormal thickening or thinning of the adhesive.

2. The presence of discolored, very thin fluids on the top of an opened adhesive drum.

3. The appearance of half-dollar-shaped gray or green discolorations on the surface of the adhesive.

4. A change in color. Frequently rust contamination will display itself by altering slightly the base color of an emulsion or dispersion.

5. Any radical change in odor.

6. A pronounced lack of uniformity, evidenced by a settling of adhesive solids or stratification and layering of the adhesive mix in the drum prior to using.

Any of the above or any combination thereof is sufficient cause to consult your adhesive supplier. Employing overaged adhesive is a risky policy at best. Adhesive stocks should be rotated so that the user has no more than 60 days' supply of adhesive on hand. Although the stated shelf life of most packaging adhesives is set for 90 days, it has been established that, after 60 days, there is evidence of some slight impairment in operating effectiveness. A storage life specification should include at minimum:

Storage life – 90 days maximum.
Rotate stock for use within 60 days.
Storage temp. range 45° to 95°F.
Protect from freezing in transit.

Miscellaneous Information

The specification might also include a wide variety of information besides the general requirements listed above. For example, it might also include information on the:

1. Setting speed or compression time needed for adhesion.
2. Optimum film thickness of wet adhesive applied to the adherents.
3. Special requirements of water, oil, mildew, vermin, and so on, resistance.
4. Flexibility of the adhesive film at the interface.
5. Heat or cold resistance of the adhering film.
6. Specific adhesive properties of the grade; that is, ability to adhere foil, cellophane, polyethylene, saran, and so on.
7. Toxicological properties of the adhesive film.
8. Migration or straining characteristics of the adhesive when in contact with various adherent surfaces.
9. Reaction of various dyes, reagents, and so on, on the adhesive film for the purpose of determining transfer effectiveness.
10. Residual odor of the adhesive film.
11. pH value of the wet adhesive film.

MAINTAINING ADHESIVE QUALITY

It is impossible for an adhesive user to exert any direct influence over the manufacturing quality of the adhesive he purchases. However, he can provide many checks and procedures to maintain adhesive quality once the product has arrived at his plant. To begin with, it is difficult to maintain any semblance of quality control whatsoever if we do not have at least the following in-plant procedures:

1. A record of the date of arrival of each adhesive shipment.
2. A record of the adhesive supplier's assigned lot number in each purchase of adhesive received.
3. A correlation record of the adhesive used on various machines and jobs in the plant according to lot numbers.
4. A physical sample of each major lot number of adhesive received by the plant with complete accounting of lot numbers, dates or arrival in plant, and so on.

With a bare minimum of precaution taken, as outlined above, the packaging engineer is in a position to trace production difficulties to adhesive failure if the adhesive is, in fact, the culprit. It often seems that, when a packaging failure occurs, the blame for bond failure rotates immediately to the adhesive. Very little consideration is given to the fact that the adhesive may have been applied in an improper film thickness, or that it may have been overaged and should not have been used in production.

If the adhesive is faulty, then the defective lot number may be singled out and isolated from production. Without some realistic basis of approach to adhesive usage, the consumer is vulnerable to the entire set of vagaries that make up the packaging equation. (*End*)

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Designer, age 25-35. Some college preferred experience in packaging equipment design such as found in textile, food and meat industries. Some travel, good starting salary, incentive plan. Reply in strict confidence to Box 233, Simpsonville, South Carolina.

Top Notch Man to supervise waxing, dewaxing and gluing operation. Broad knowledge of Staude Master and Right Angle Machines essential. Replies confidential. Reply to Box 1001, **PACKAGE ENGINEERING.**

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What we think

Man-made obstacles should not slow up packaging progress

Any number of books and magazine articles (and some movies) have focused attention on the trying "human relations" problems of individuals and groups *within* a company. Some accounts have been highly fictional and unrealistic, others alarmingly accurate.

It disturbs us to see how much of this sort of thing is going on *between companies* and groups of companies, as well as merely within a single company itself. We are convinced that the frustrations and inhibitions inherent in these delicate relationships present roadblocks to technical progress in packaging.

Who wants to upset the apple cart?

An obvious example of this is where a user wants a new package for some particular product that has, say, difficult protection or transmission characteristics. The user packaging specialists soon find themselves inching through a maze of delicate relationships between package fabricators and package material suppliers. Next it turns out that some of the fabricating or supply people, who ought to be most interested in tackling this new problem, are indifferent, even reluctant to consider it.

Word comes to us that a new development sometimes upsets a pattern of historical relationships. Certain material suppliers are accustomed to working with certain package fabricators, and vice versa, and do not warm up to anybody bypassing these invisible channels. We recently learned how an expert from a material producer made a lot of people mad at him by dealing directly with a large package user. Apparently some folks among the fabricators thought they, rather than he, should carry the story to the user.

A research expert in a nationally known company told us that the biggest thing he learned from one major package development project was patience—when trying to get people together from different companies to work on the same problem. He found out the hard way what it takes to do things in a new field, such as in some area of packaging technology where new product-package relationships and difficulties arise constantly.

Where everybody is groping in the dark, it is hard enough to walk through a problem of package development without having to find one's way through a lot of politics, intrigue, jealousy and inertia. And some of these people guard their secrets with security precautions that would be a credit to Fort Knox. Fortunately, other companies are finding out that *sharing* of information in such projects, rather than throwing up a wall of secrecy, is the real path to progress.

Looking at this tangled situation from the viewpoint of a fabricator or supplier who has worked hard to solve some particular problem, it is easy to understand his reluctance to pool his know-how with competitors. (At the same time, users sometimes complain that they work long and diligently with some supplier to arrive at a unique package, then are dismayed to find its salesmen peddling it "up and down the street".)

Can't we cut through these barriers?

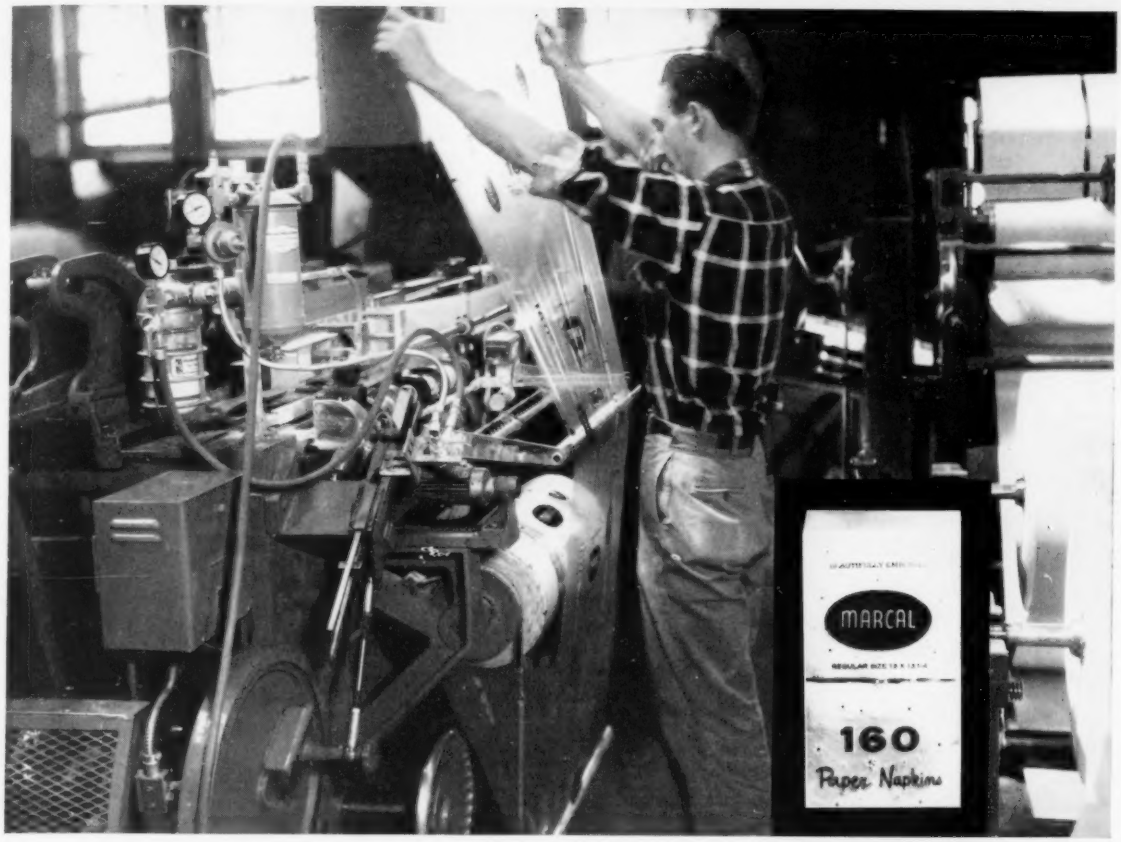
Technical problems are tough enough to solve without such artificial barriers as those just mentioned. It's time the interchange takes place more freely. More three-way plant visiting would be a good thing.

If more users would visit suppliers' and fabricators' plants, and vice versa, the technical solutions would come a lot more easily.

In the long run, free sharing of information would help rather than hinder a company doing it. Technological progress today is moving so fast that a secret means no more than a brief delaying or holding action. The better course would be that of "full speed ahead," seeking real progress rather than worrying about upsetting some delicate relationship or clinging to the illusion that a certain bit of know-how is a real secret.

Bruce Hollingsworth

Editor



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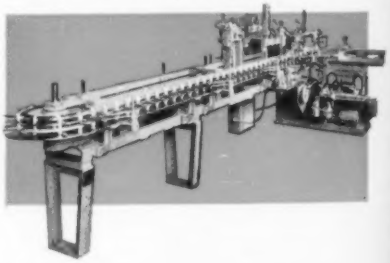

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